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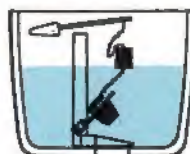
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Cover: Illustration by Phillip Singer

We've cleaned up more towns than Wyatt Earp.



The Dodge City Protection Association, led by Wyatt Earp (seated second from left).

This may come as a shock, but the average American home is loaded with hazardous wastes.

The fact is, a lot of that seemingly harmless stuff we've all got lying around the garage or the basement could be incredibly dangerous.

Like the old jars of paint from the kids' model airplane years. The pesticides from some long-forgotten experiment in home gardening. And the brake fluid and motor oil from the days when do-it-yourself seemed like a good idea.

The memories may fade away, but the hazardous chemicals won't.

However, in city-after-progressive-city, people are waking up to the fact that we can't continue to treat our homes like hazardous waste dumps, and we can't continue to throw toxic chemicals out with the rest of the garbage.

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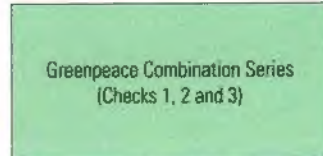
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The Junk-Mail Debate

If you're looking for nontrendy clothing with strong seams, then the L.L. Bean catalog isn't junk mail. If you heard about **GARBAGE** through a letter in your mailbox, then my subscription solicitation wasn't junk mail.

Somebody has a good business or a special-interest magazine. How can he let other people know about it? He could broadcast it on television, but that wouldn't be a good idea. It would cost a lot of money for a few seconds of time, because the message goes out to millions of people; it plays in a specific slot to an untargated array of people who are distracted and not expecting to respond.

So instead, the entrepreneur rents lists of people whose general characteristics show they are likely to be interested. She sends announcement mail to these people, and they're free to ignore it or to read it in their own time. Because they are reading, they are more involved; therefore, more real and useful information can be offered. If they want to respond to the offer, they can readily use the order form or reply card.

This is America: a free society where people have a right to publish, where we're allowed to start businesses and compete in the marketplace.

Mail is one way information is exchanged in America. It's one way market choice is maintained. The Soviet Union, for example, doesn't have a junk-mail problem.

Last Christmas, I mail-ordered half of the presents I bought. Because I had time to think and peruse, I purchased items of real value and utility. Because I did not go out on endless car junkets, I contributed a little less to traffic and smog and oil consumption and global warming. I find myself fast becoming a mail-order convert.

The price I pay, of course, is more stuff in my mailbox. This doesn't bother me. I've thought through the alternatives, and I'll take mail any day. It's quiet; it doesn't get me up from the dinner table or demand a polite response. Maybe something's wrong with my adrenal glands, I don't know — telemarketing must work or it wouldn't be so popular,

right? But while I have no discernible physical reaction to tossing unwanted mail into the recycling bin, I find myself ready to punch somebody when an offer comes by phone.

Junk mail is news. For example, although I give money to only a few environmental groups, I'm very interested in what the rest are up to. So I read their mail. About politics, publishing, consumerism, education, the mail gives me specifics and, over time, it reveals trends.

Yes, I do get true junk in my mail, too. Freedom means freedom for all; we take the bad with the good and hope the marketplace puts the charlatans and jerks out of business.

I'll send out 1.2 million pieces of direct mail, say, and net 12,000 paying subscribers. That's one percent — pretty standard. Non-publishers blanch at the perceived wastefulness (and friends worry about my ego). But as an editor, I value the newsworthiness of the mail itself. Only twelve thousand people said yes, they'll pay for it and read a year's worth of issues. But a majority of those 1.2 million people now know that an independent, practical magazine on environmental awareness exists. That carries its own effect; I'm glad of it.

In the latest **GARBAGE** direct-mail effort, I spell out for the first time our efforts to reduce waste: We use recycled (and recyclable) paper, to help create demand for recycled; we use less paper; we buy envelopes without plastic windows; we don't poly-bag or kraft-wrap; we pay for a computer merge-purge to cut down on duplicates; we offer a prepay option to save billing paper; we have a bulksubs program to cut down on direct mail to individuals.

There's room for improvement, of course, by us and others. Heightened environmental awareness will help, but most of the waste reduction will come from mailers trying to keep costs down.

In the meantime, somebody had to say it, and I'll take the heat: Junk mail is good.

Patricia Poore
Editor



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Senior Editor
BILL BREEN

Contributing Editors
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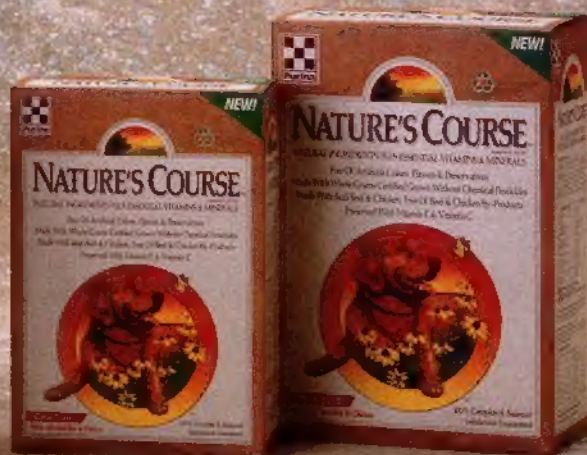
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Egregious Elwood ... Burning Questions ... Cheesecake Centerfold ... Fragrant Fan Mail ... Fit for Fresh Kills



Watch it, Buckos...

CRUEL CARTOON I

I was disgusted by Elwood Smith's cover illustration (March/April; at left) depicting both a "hand-cuffed" bird and a rabbit hung from a rope being used to help run a "recycling machine."

I realize that this is merely a "cartoon," but the message is still there, loud and clear. I would greatly appreciate it if your artwork was more carefully chosen, and animal drawings, pictures, etc. were left out.

Donna LaGrafte
McKinleyville, Calif.

CRUEL CARTOON II

Watch it, Buckos! Your article "It's Saturday and the Tap is Flowing" (March/April centerfold) appears awfully sexist. According to your illustrations, women are still trapped in the kitchen or on display naked. Where's the man's torso while he's shaving?

Otherwise, great work!

Liz Diether
Seattle, Wash.

BURNED UP

The article "Burn It?" in the March/April issue is an

amateurish piece of technical journalism. I am especially saddened to write this because not only did I suggest to Breen that he visit Semass to get a good idea of what state-of-the-art waste-to-energy facilities are all about, but I also supplied him with background materials on the technology involved in both recycling and waste-to-energy.

My two major concerns: 1) The article fails to point out that waste-to-energy is but one component of a comprehensive waste-management strategy and that Semass exemplifies this in-

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 - a. The water surrounding fuel rods in a nuclear plant.
 - b. Wastewater from household sources used to water lawns and gardens.
 - c. Tainted spring water.
2. When completed, the largest structure in the world will be:
 - a. A 42-screen multiplex in the San Fernando Valley.
 - b. The Leningrad McDonald's.
 - c. The Fresh Kills landfill on Staten Island, New York City.
3. "Compact Fluorescents" are:
 - a. New pesticides that are highly concentrated and very toxic.
 - b. Energy-saving light bulbs that use 75% less electricity than standard tungsten bulbs.
 - c. A new all-midget rock band.
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 - a. Your best source for practical environmental information.
 - b. Even cheaper if you subscribe for 2 or 3 years.
 - c. Printed on recycled paper.
 - d. A great gift for that special someone.
 - e. Read by top Hollywood celebrities.
 - f. All of the above.

1-b; 2-c; 3-b; 4-f
Answers

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tegrated approach. 2) Instead of focusing on the characteristics — positive or negative — of Semass, the article quickly resorts to a tired review of the general complaints self-styled environmentalists express about waste-to-energy.

It is misleading to give the impression that recycling does not produce some kind of residue similar to the ash from waste-to-energy facilities. What term will be used to describe it? Will it be more concentrated, in different, but more toxic, form? Will toxic or disease-laden materials that could be rendered harmless after combustion pass through a materials-recovery facility intact?

When you apply sound technical and engineering principles to waste management, you simply cannot conclude recycling is acceptable and waste-to-energy is not. It is a shame that Breen chose to ignore source material that explains this.

Jason Makansi, Editor
Common Sense on Energy
and Our Environment
Morrisville, Penn.

As my article states, incinerating and recycling are just two of the options in an integrated approach to waste management. I don't find anything in Mr. Makansi's letter that factually disputes my report. His concerns, I believe, were covered in my article and in

William Rathje's sidebar.

With recycling, of course, the real challenge is developing markets for all the collected material; the article acknowledges this. (See also "Selling It," Nov/Dec '90.)

I thank Mr. Makansi for the material he sent from his trash-to-energy trade journal. I found that the material excludes any question of the environmental or fiscal consequences of burning.

GARBAGE will continue to cover all sides to getting rid of garbage. — B. Breen

Count Wallingford, Connecticut, among the communities who can't find enough trash to burn and keep their incinerator going.

By state law, we are required to recycle the standard list — glass, cardboard, cans, newspaper, plastic, etc. The more we recycle, the less gets dumped at the incinerator. The company running the incinerator can't make enough money if tonnage drops off. And they also won't get paid if they can't make the steam to run the American Cyanamid plant next door. So, what's the answer?

Marlene Ruderman
Wallingford, Conn.

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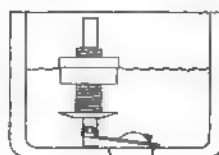
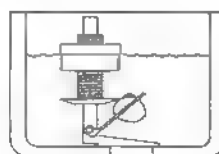
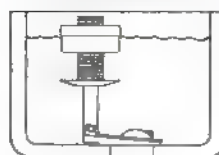
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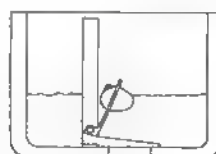
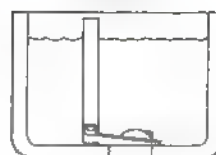
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Cynthia A. Georgeson
Environmental
Communications Manager
S.C. Johnson & Son, Inc
Racine, Wis.

Cmon Leslie Fay!
After installing an outlet at my compost pile for an electric heat tape (to keep it active in winter), I had an extra outlet. One of those Plug-Ins was just the ticket

to overcome the musty odor of the pile.

Wayne Taylor
Fort Dodge, Iowa

PALM SPRINGS SALUTE

Please CANCEL my subscription and SAVE OUR TREES and spare Fresh Kills Mountain another inch.

GARBAGE has become a big disappointment. It started out as an environmental magazine but has become another profit machine. Too many New York environmentalists seem terribly naive and provincial.

You've been taken over by Reagan and Bush's continuing brainwashing,

as they intended.

Dorothy Harte
Palm Springs, Calif.

Ms. Harte sent us the above letter with her copy of the March/April issue cut into little squares, all stuffed into a plastic envelope with \$2.61 postage due. Don't worry, Dorothy, we paid it.

CORRECTION

Last issue's "Report on Home Water Purifiers" reported that carbon filters can't remove lead. However, the National Sanitation Foundation reports that some carbon filters can, including the Amway E-9230 mentioned in the article. Call the NSF at (313) 769-8010 for more information.

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So far, you've been able to recycle, volunteer at the local food bank, support your favorite causes, and snip those little plastic rings on a six-pack of soda.

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country clubs, or nuclear power plants. (If the government wants to invest in these things, you don't have to help them.)

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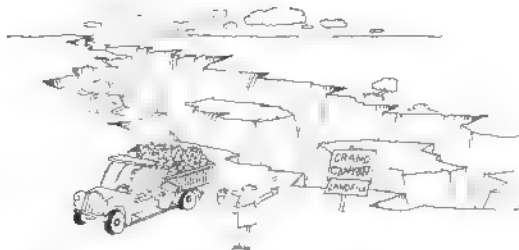
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Free Speech in the

PROFILE

Twelve years spent working for the National Forest Service, the federal agency that tends 191 million acres of public land, brought Jeff DeBonis little more than paychecks and a gut full of frustration.

A timber-sales planner for Oregon's Willamette National Forest, Mr. DeBonis

soured over what he perceives as the agency's real-world mission: to supply the timber industry with raw wood clearcut from federal forests, regardless of the environmental consequences. Jeff thought about quitting and going to work for an outside environmental group. Instead, he stayed. And dared speak out.

"The Forest Service needs to retake the moral high ground," he announced in a letter to co-workers. "Our goals

• Boycott Blues

"Let's give a giant corporation grief," begins an article by Michael Stipe, of the pop group R.E.M., in the May issue of *Spin* magazine. Mr. Stipe calls on readers to support the boycott of General Electric (a major military supplier) organized by the California group INFACT.

On April 13th, Mr. Stipe and his band appeared on NBC's *Saturday Night Live*.

General Electric owns NBC.... Is Michael Stipe confused? Not according to INFACT — their boycott applies only to consumer items like light bulbs, appliances, and (strangely) medical devices like CAT-scan machines.

If Mr. Stipe were to *really* boycott GE, he'd have to endlessly ask himself questions like these: Does this car/computer/appliance contain a GE plastic? Was this fruit shipped on a train pulled by a GE locomotive? Is this plane that's flying me to my next gig equipped with GE engines? Is this guitar amp powered by electricity generated by a GE turbine?

Etc., etc. You see, GE is a 60 billion-dollar-a-year corporation.

That's roughly equal to the combined GNP of Ireland and Portugal. Since 1985, when the boycott began, GE revenues have increased 79 percent; earnings are up 87 percent.

—Brian Jacobsmeier

Woods

[should be] much closer to those of the conservation community than to those of the timber industry." By openly challenging the agency to value ecological sensitivity over board feet, this Forest Service veteran is pioneering a kind of *glasnost* in the area of free-speech rights for all federal employees.

If an employee speaks out in the woods, does the Forest Service hear him? You bet. But early attempts to censure Jeff changed to uneasy cooperation as the Forest Service worked with him, as well as the Department of Justice and the federal Office of General Counsel, to draft the Willamette Guidelines for Voicing Opinions. The Orwellian-titled document actually recognizes what many take for granted — the right of federal employees to speak as concerned U.S. citizens

"The Guidelines cover three categories that help determine whether you're getting into a legal grey area," says Jeff. "You can speak freely so long as you're not knowingly lying, you're not gaining monetarily, and you're not representing yourself as an agency spokesperson."

In 1989, Jeff organized the Eugene, Oregon-based Association of Forest Service Employees for Environmental Ethics (AF-SEEE). Membership swelled, and last year Jeff left the Forest Service to head the group full-time. Now, at least 1,700 Forest Service workers (and presumably their bosses) get the Association's quarterly newsletter, *Inner Voice*. It's a forum for those who want to swap opinions and ideas on reforming the Forest Service — from within.

— Bill Breen

For subscription information, contact AF-SEEE at PO Box 11615, Eugene, OR 97440; (503) 484-2692.



ERIN BONNER

Jeff DeBania

• Get the Lead Out

GARBAGE readers are a classy bunch. Some of you probably have a lead-crystal decanter of fine old brandy at home. Maybe it's been sitting there for five years or so — awaiting the rare very special occasions.

Too bad you may have to pour the stuff down the drain.

Modern lead crystal contains 24 to 32 percent lead oxide. Researchers at Columbia University have discovered that the lead leaches into wine and spirits. How much? It depends on the amount of lead in the glass, and how long the liquid sits in it.

The EPA allows a maximum of 50 micrograms of lead in a liter of liquid. After one hour in a crystal glass, wine averaged 68

FOR THE RECORD

"Protest the use of live chickens in an arcade tic-tac-toe game."

One of the recommended letter-writing actions in the March issue of *Animals' Agenda* magazine.

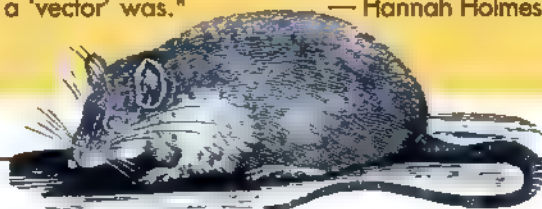
GARBAGE DICTIONARY

Vectors, noun, pl. Technobabble for rats, flies, and other creatures that hang out at the landfill, pestering garbage handlers. Derived from the Latin word for "to carry," in recent centuries "vector" referred to the transportation of people and goods. Now, the word has landed in the gutter — Webster's defines "vector" as "a disease-carrying organism."

"I heard the term in the '60s and the '70s," says Peter Block, a spokesman for Browning-Ferris Industries, a major waste handling firm. "In the early days, it just meant 'rat.'" Now, "vector" covers any scurrious scavenger that might carry a pathogen out of a landfill and into the food chain.

The word is tossed about by hardcore garbologists, who might say something like, "Our objective is to manage solid waste in a manner that is nonconductive to vectors." If at first the term conjured only vague recollections of geometry class, you're not alone. Says one ex-EPA staffer, "It took me a year to figure out what the hell a 'vector' was."

— Hannah Holmes



FOR THE RECORD

"I saw Alec Baldwin and Ron Silver, talking knowledgeably about sewage. They were really sexy then."

PR person Susan Bond, quoted in *New York* magazine.

micrograms of lead per liter. Brandy stored for five years in a crystal decanter had a whopping 20,000 micrograms of lead per liter — about the same concentration as the vino that destroyed the Roman Empire.

While the FDA is studying the findings, the Steuben division of Corning International has put new labels on their lead-crystal decanters: "For decorative use only."

• Recyclable ... Really!

Take heed, plastics makers. Organizations that represent the plastics industries of four countries and Europe put their heads together recently and determined a top priority: develop a code of ethics for plastics recycling. "In other words," their report reads, "'recyclable' must mean that materials can be recycled and that the public will have access to the recycling process."

• Back to the Land

Remember Hannah Holmes' joking reference to "moss couches" in "The Truth About Tampons?" (Nov/Dec 1990). Johnson & Johnson must have been listening!

A "natural" sanitary napkin with a peat-moss lining is now available in Canada.

Johnson & Johnson says their Sure & Natural Prima works just as well as those superabsorbent, "ultra thin" napkins with gelling agents.

The peat-filled pad looks like a regular napkin (unless you cut it open). The box it comes in makes no reference to the novel ingredient. "We're mak-

ing no environmental claims for it," says J&J spokesman Bob Kniffen. "People generally aren't interested in what's in a product of this nature."

Niffen says no decision has been made about marketing the peat-filled napkin (developed by J&J's Canadian division) in the U.S.

• Veteran Recyclers

Auto-parts companies are finally taking credit for decades of reuse in their industry. They've designed a logo (a globe skewered with a rocket-like object) for promoting rebuilt generators, transmissions, master cylinders, and the like. The rebuilding industry estimates it saves millions of barrels of oil and millions of tons of metals each year.

• Keep Your Garbage

A revision of the Resource Conservation and Recovery Act (RCRA) which would radically change the way the U.S. handles its waste has been introduced by the Senate Environment Committee, chaired by Senator Max Baucus of Montana. The bill sets recycling goals, encourages pollution prevention, and regulates non-hazardous industrial waste, among other things. A controversial feature: States that demonstrate proper handling of their own waste can ban imports of waste from other states.

• Another Simple Thing

Tambrands lauds its original paper-tube tampon as an environmental hero, implying that women who care wouldn't buy the ones with petal-soft-pink things. But conspicuously absent from the company's special edition of 50 *Simple Things You Can Do To Save The Earth*, to be given to one million Tampax paper-tube tampon customers, is Simple Thing #51: "Avoid our plastic-applicator model." (Purchasers of plastic-applicator Tampax are treated to a music cassette of eight "party hits.")



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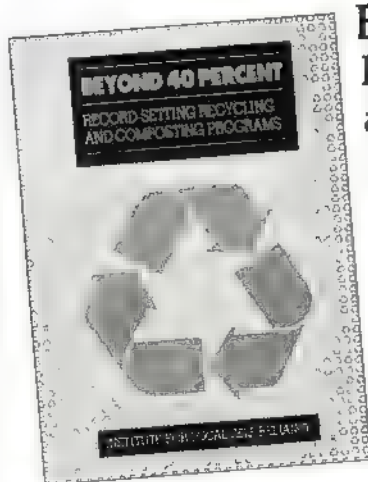
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NEW!

FOR THE RECORD

"If everyone on Earth just stopped breathing for an hour, the greenhouse effect would no longer be a problem."

From a *Newsweek* ad touting the magazine's "unconventional wisdom."

heavy metals and chemicals like benzene and ethylene chloride. The Massachusetts law also requires industries to set goals for toxics reduction. The Massachusetts Public Interest Research Group estimates the state's industries produce or use 1.42 billion pounds of toxics each year — 20 times more than they reportedly release.

• Toxic-Users Expose

Starting July 1, Massachusetts' 600 largest industrial users of toxic chemicals will have to reveal not only their release of toxics into the air, land, and water (as required by the federal EPA's Toxic Release Inventory), but also their in-house use of

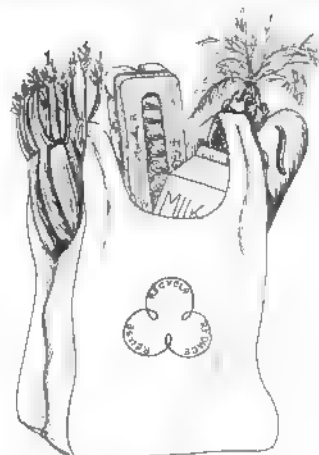
• Singing in the Herbicides

Just as native Alaskans have numerous words for snow, industrial American society is developing a collection of rain lingo. Add to the list "herbicide rain." Presumed to vaporize off Midwest corn and soybean fields, herbicides have recently been found falling from the skies over 23 Midwestern and Northeastern states and parts of Canada.

• Safer Mud

Getting to the bottom of their ocean-pollution problem, Washington state has instituted the nation's first sediment standards. Water is usually the focus of pollution abatement and testing. But toxic materials often sink to accumulate in mud and sand, where they can cause tumors, disease, and reproductive failure in fish and shellfish.

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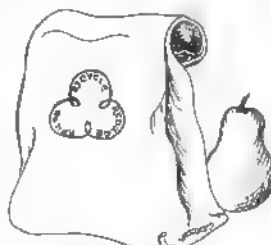
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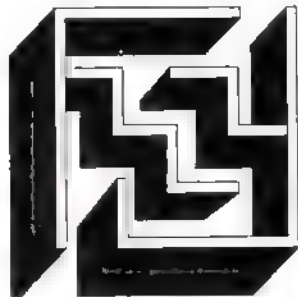
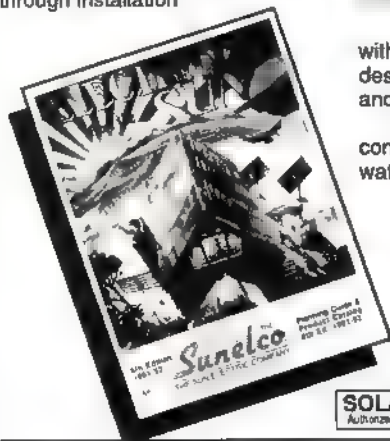
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With floppy disks, reuse is easier than recycle; chasing your AC's CFCs; the silver lining in darkroom chemicals.



ILLUSTRATIONS BY DAVID BRION

Q: I work for a large company, where every employee has a computer work station. This results in hundreds of floppy disks being discarded each month. Are there ways to recycle these things?

*Eric Winkler
Basking Ridge, N.J.*

A: If you're sure that none of your computers will ever get a virus that might be circulated on a disk, you could slap a new label on each old disk and put it in a basket for all to use. But computer disease is rampant,

making that a pretty big "if." A safer, simpler bet is for each employee to continually clear and reuse each disk until it turns up its magnetic toes and croaks. When this happens, you have no choice but to dump it. No one is set up to process and market the materials that make up computer disks.

If you and your co-workers generate enough disks, your company might consider investing in a degaussing machine to erase disks (a gauss is a measure of magnetic energy). Degaussing brings the "brain" of the disk to its virgin state, removing the formatting that tailors a disk to a specific type of computer. It also wipes out any viruses.

You can't convince your boss to spend \$1,500 to \$2,000 on a small degaussing machine? Some companies let Covenant Recycling Services of Butler, N.J., recycle their leftover disks.

Covenant salvages as many as 50,000 disks a month, selling them to school districts, and to "anybody who's not hung up on brand-new, shrink-wrapped disks," says co-owner Deborah Bader.

Anyone can send full (but otherwise healthy) disks to Covenant for recycling. If you generate large quantities of excess disks (at least 100 per shipment), set up an account with Covenant. In exchange for

your disks, they'll pay your shipping costs plus a little more — which will be sent to the charity of your choice, in your company's name. In other words, you get a tax deduction with your waste reduction.

Covenant Recycling Services, P.O. Box 759, Dept. GM, Butler, N.J. 07405; to establish an account, call (201) 838-1336.

Q: When will the new, CFC-less air-conditioning units become available?

*Anne DiSabatino
Landenberg, Penn.*

A: Newer home air conditioners (and some refrigerators) use HCFC-22, which has only two to five percent of the ozone-depleting capability of CFC-12, used in car air conditioners. Since HCFCs are considered relative "good guys" in the halocarbon world, they won't be banned until 2030. (CFCs will be history by the turn of the century, if not sooner.) Expect HCFCs to be the compound of choice for quite a few more years.

Your home air conditioner is a pretty stable unit. Generally, refrigerant escapes only during servicing, whereas auto air conditioners — which are powerful enough to cool a medium-size house — tend to leak, requiring a recharge of refrigerant every two or three years. According to the National Audubon Society,

When servicing your AC, make sure the repairman doesn't vent CFC-laced refrigerant.

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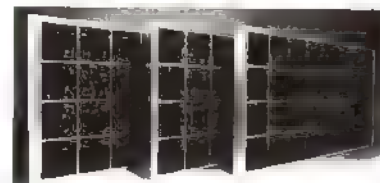
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mobile air conditioners make up 24 percent of the average person's CFC use, while home air conditioners are responsible for just three percent.

When servicing your home air conditioner, make sure the repairman doesn't vent the refrigerant into the air. By July 1992, it becomes illegal to vent CFCs this way, so more servicers are starting to get the necessary equipment to capture and recycle the stuff. The same goes for your car: Take it to

a mechanic who will recycle the CFCs in its air conditioner, making sure the hoses are tight and all right. Aging cars, air conditioners, and refrigerators should have their refrigerant captured before they're dumped.

Just limiting your use of home or auto air conditioners won't save the world from CFCs — if there's a leak, it doesn't matter if the "on" switch is off. But leaving the AC off helps in another way: Reducing your energy demands mean less carbon dioxide (from a power plant or your car's engine) gets into the atmosphere.

Q: What is the best way to dispose of used chemicals from a photography darkroom?

Nancy Collander
Columbus, Ohio

A: Black-and-white photographic chemicals (developer, stop bath, and fixer) that have been mixed with water can be flushed down the drain — with plenty of additional water. Generally, a municipal sewage-treatment facility can handle the dilutions. If you use a septic tank, check with local authorities before pouring chemicals down the drain. You don't want this stuff in your groundwater, and it can wreak havoc with the bacteria in your tank. The safest course: Find someone who's hooked to a sewer line, and let them flush your chemicals.

During print-making, the chief concern is the silver that washes out of the paper and collects in your fixer. If you make just a few prints a month, don't worry about it. But if you're more prolific, try to get your silver recycled. Talk to local photo labs or rent-a-dark-room places — they might

let you dump your used fixer into their silver-recovery unit. Silver is worth only about four dollars an ounce, so you're not likely to find anyone who'll go out of their way to collect a few grams.

Unused, unmixed chemicals are a household hazardous waste. Take them to a collection site. Better yet, turn them over to a school or charity that can use them.

If you're unsure about a product, ask the manufacturer for a Material Safety Data Sheet (MSDS). It's a chart that identifies chemical compounds and their toxicity, and recommends first-aid procedures and disposal methods. Some photographic solutions are relatively benign. Others — toners and intensifiers, for example — are toxic as all get-out, so read those labels.

A new organization called PhotoGreen is forming to help amateur and professional photographers address these issues. For a copy of their newsletter, write PhotoGreen, RD 2, Box 638A, Hampton, NJ 08827.

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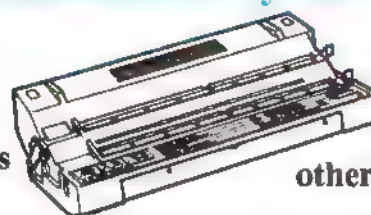
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Morey's Mystery

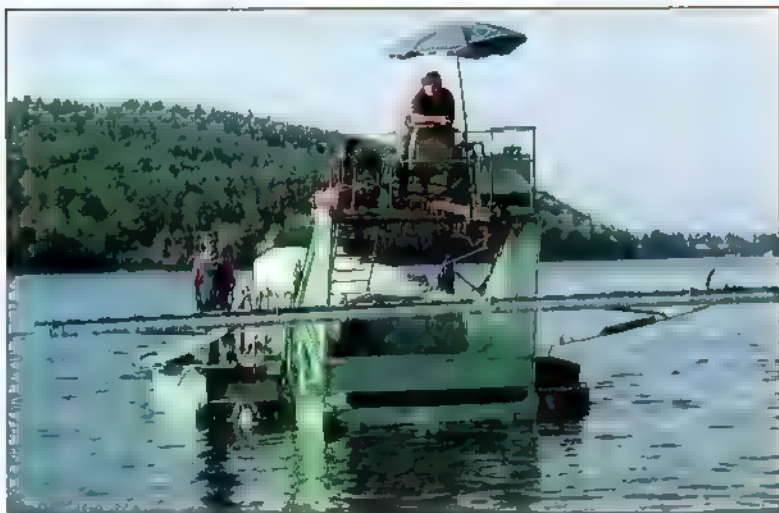
As environmental awareness crept into the people who summer on the cool shores of Vermont's Lake Morey, it occurred to them that scummy green isn't the right color for lake water.

They jumped to the conclusion that the algae blooms which burgled oxygen, killing off yellow perch, were the result of their sewage seeping into the lake. So, in 1985, folks steeled themselves to pay for a \$3 million sewage-treatment plant to replace their private septic systems.

But — just in time! — sleuths from the Vermont Department of Environmental Conservation appeared. Armed with test tubes, the detectives looked for phosphorous, an omnipresent element that speeds algae growth. However, when they sampled water flowing into the lake, researchers couldn't find enough phosphorous to account for the blooms.

So they turned to local history books — and discovered that, at the turn of the century, three large resort hotels and about 120 private homes were built on Morey's shores. Back then, it was standard procedure to pipe phosphorous-rich sewage into the closest body of water.

Normally, each year's load would be absorbed by algae, eventually to be locked in lake-bottom sediments. So



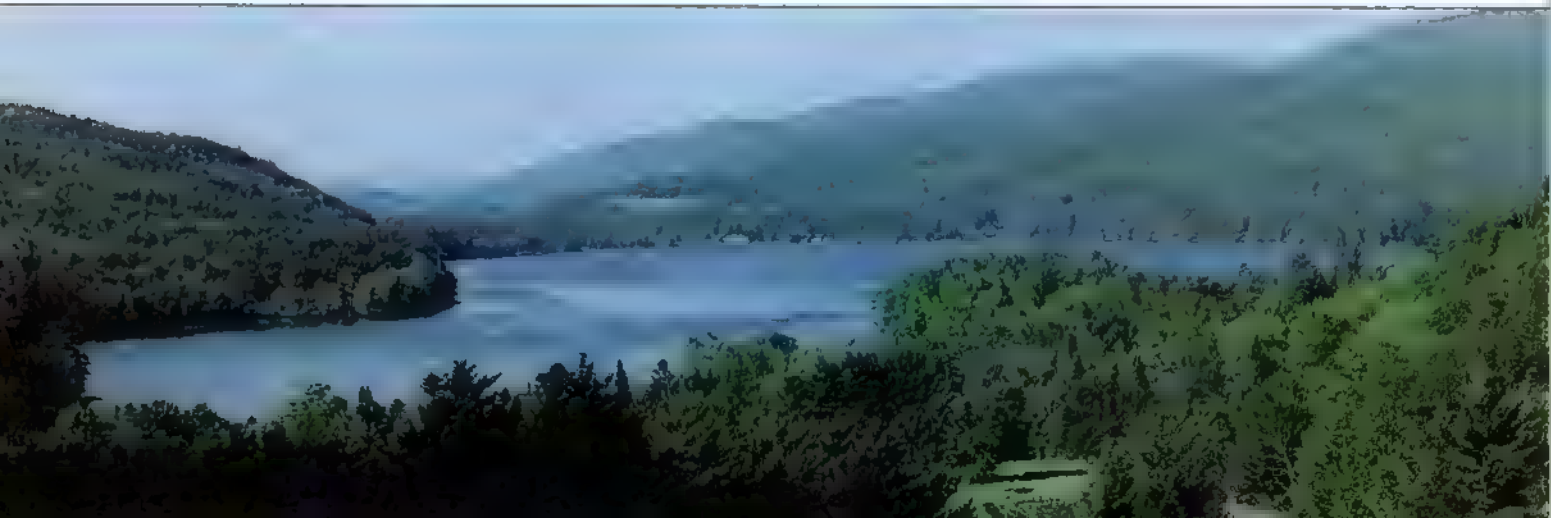
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why was Morey's old phosphorous still in circulation? It seems that the lake's unusual shape (steep and deep), and the rare chemical makeup of its sediment, meant that most of the phosphorous didn't bind with the mud. Every year, the same old nutrients were released into the water to overfeed a new generation of algae.

Having solved the mystery, in 1986 workers injected 175,000 gallons of aluminum compounds into the deep water — which, when carefully applied, does only minor, temporary harm to fish and other lake dwellers. Almost immediately, the water turned from green to blue as algae vanished. The phosphorous has been under house arrest ever since.

— Hannah Holmes

Vermont's Lake Morey: 540 acres, no longer scummy green.





RUN SPOT RUN!

Nowhere is chemical dependency as evident as in Rover's food dish and Fluffy's flea powder.

If you were fed powdered chicken guts every single day of your life, wouldn't you claw the back of the sofa? If your entire person were dusted with chemicals labeled "do not inhale," mightn't you bite the mailman?

Our pets are ever so tolerant. Perhaps it's because they can't talk, but you don't hear cats and dogs complaining about pollen, cigarette smoke, radon, formaldehyde, and benzene in the house. Like us, they breathe bad air. With us, they tolerate noise pollution, strange-smelling tap water, and a panoply of household hazards including roach killer, cleaning chemicals, and outgassing carpets.

But the lives of our pets differ from ours in two important areas: They don't get to choose and vary their diet, and they can't control what we put on them to keep fleas and ticks away. Nutrition and exposure to toxic substances — these are sizable wedges in the quality-of-life pie.

WHAT'S THAT YOU'RE EATING?

You've probably heard horror stories about pet-food ingredients. Livestock that, due to any number of diseases, is condemned for human food use is fair game for pet foods. These delicacies are often augmented with tummy-filling vegetable

by-products like wheat middlings, corn gluten meal, and beet pulp. Exposing the ultimate in closed-loop recycling, the *San Francisco Chronicle* in 1990 wrote about meat renderers who routinely picked up dead dogs and cats from animal shelters to add to their meat and bone meal, which they sometimes sold to pet-food makers.

Actually, the first ingredient in the average cat or dog food is grain, often corn. It's cheap, and high in energy. (If Fido makes large, loose doos, it's also a waste of money — he's not converting the ingredients to energy.) Then comes the good stuff. The meat and bone meal that figures prominently on most labels consists of the rendered tissues (including the esophagus, diaphragm, and blood vessels) and bones from cows, goats, pigs, and sheep. By-products may be fish heads, tails, and bones, chicken feet, feathers, and heads, or animal lungs, blood, and organs. All these are thoroughly cooked, dried, and pulverized.

Sound good? Well, add some chemicals. To keep the animal fats fresh, antioxidants are needed. To make the cheese kibbles yellow and the beef kibbles red, add dyes. (This is for you. Dogs and cats are colorblind.) To keep those colors from fading, add more preservatives.

Then again, the growling about pet foods may not always be warranted. For example, the preservative

ethoxyquin is now under fire from the animal-rights lobby, who accuse it of causing cancer. The whole flap started, says Dr. David Dzanis of the FDA, with one breeder who had four dogs die of cancer. Finding a long, chemical name on her dog-food bag, she published a damning diatribe in a breeder's newsletter. Thus far, no scientific evidence supports the breeder's assumption; nonetheless, many consumers have since decided ethoxyquin causes not only cancer, but a long list of other ailments. Says Dr. Dzanis, "The best story was that a cat's hair mats were caused by ethoxyquin." Ethoxyquin, like the common pet-food preservatives BHT and BHA, is permitted as a preservative in some human foods. That's no guarantee that it's safe, of course. But it seems to indicate that we'll snarl quicker about our pets' diets than about our own.

Perhaps the reason we're snappish is that it's a heck of a lot harder for consumers to assess the nutritive value of pet foods than people foods (and some folks would say we aren't told enough about people foods). If you examine the nutrition label on a bag of pet food, you may read, "Crude protein: 27 percent."

"Great!" you think. "Buffy needs protein." The bag doesn't mention that the protein sources may be sheep stomachs and chicken feet — tough

BY HANNAH HOLMES

A vegetarian diet is dubious for miniature dogs, growing dogs, and pregnant dogs. Cats, no way.

.....

stuff to digest. So the protein percentage tells you nothing about how much protein Buffy's body will actually be able to use.

The next problem with the label is that energy value (calories) isn't shown. See, if Buffy needs two cups of food A to get a day's worth of energy, or four cups of food B, then food A needs to offer twice as much protein (and fat, vitamins, minerals, etc.) as food B, 'cause Buffy's eating half as much each day.

So what can we learn from a label? About the only thing of use is the fine print, stating that the food is "complete and balanced" (or words to that effect), as defined by either the National Research Council or the Association of American Feed Control Officials. (AAFCO protocols require that manufacturers feed their grub to test animals.)

There's no shortage of folk wisdom on doctoring up pet food at home. Brewer's yeast (for coat and fleas), vegetable oil or cooked liver (for skin problems), and garlic (for fleas) are commonly recommended additives. Dr. Michael Fox of the Humane Society of the U.S. advises adding brewer's yeast, seaweed, vegetable oil, and garlic to commercial dog food.

Pooh-pooh, say pet-food makers and regulators. "Where did he get his nutrition degree?" laughs Richard Sellers, an animal nutritionist who chairs AAFCO's pet-food board. He maintains that any fiddling with a carefully balanced recipe will alter a commercial food's nutritive value. (Just like people, animals get the most out of their diet if amino acids, vitamins, and minerals are eaten in combinations that complement each other.) Mr. Sellers is the first to note that AAFCO uses standards that provide "adequate," not "optimal," nutrition; and that since we can't know a pet's genetic potential, we can't pretend the average pet food

maximizes it. Still, he's confident that the system AAFCO recommends is as good as any in uncovering what makes good food.

Meanwhile, consumers, who have changed their own eating habits to avoid the steroids and antibiotics that may be in beef, the pesticide-plastered grains and produce, and the preservatives, hit on the realization that their pets were eating the leftovers of this chemical mess. This growing distrust has forced a leading manufacturer to take notice. Ralston Purina, noting that more and more pet owners were buying lesser-known brands of "natural" or less chemical-intensive pet foods, is marketing a "green" supermarket dog food. Their new "Nature's Course" has no artificial preservatives (vitamins C and E are used increasingly for that purpose), flavors, or colors, and is made with grain grown without pesticides.

Of course, we may be more finicky about their food than our pets are: The thought of them eating diseased cows makes us cringe. Firstly, however, the foodstuffs are cooked for hours; second, canines and felines eat what they can catch in the wild, especially sick animals. And while the subject of feeding dead pets to live pets raises the hackles of pet owners and pet-food makers alike, nutritionally, it's fine.

The simple fact that, from teeth to intestines, dogs and cats are carnivores makes some people quiver with misguided sensitivity. Eco Bella, a glossy "green" catalog, carries this note beneath its vegetarian dog food: "Out of compassion for [livestock] bred for 'food' we would like to see you switch to this nutritious vegetarian dog food." (Its crude protein, at 18 percent, is below AAFCO standards.)

This begets outrage among some animal advocates. "A vegetarian diet is dubious for miniature dogs, growing dogs, and pregnant dogs," says the Humane Society's Dr. Fox. "Cats, no way." Pumping an animal full of

vitamin and amino-acid supplements to make up for the missing meat is "quackery," he adds.

Despite their tough reputation, cats are sissies compared to dogs when it comes to digesting a roadside meal of putrefied pigeon (or metabolizing a dose of flea-spray). Their need for very high levels of protein, fat, and other nutrients means you'll see far fewer "natural" alternatives to commercial cat foods than dog foods.

WHEN BUYING FOOD:

☞ Look for the AAFCO and NRC statements.

☞ Avoid generic foods, where the emphasis is on low cost, not nutrition. With pet foods, you definitely get what you pay for.

☞ If you buy vegetarian dog food, read the label. For dry food with normal caloric density (3.5 to 4 kcal/g), AAFCO recommends a minimum of 22 percent protein (by weight) and 5 percent fat; canned food should have at least 5.5 percent protein and 1.25 percent fat.

WHAT'S THAT SCENT YOU'RE WEARING?

Ever notice that Princess looks depressed after a flea powdering? It's not just that she thinks you hate her. If conventional flea remedies weren't toxic, they wouldn't kill fleas. And Princess is soaking 'em in. If she's not slurping the chemicals up during her morning tongue bath, her skin is passing them into her bloodstream. Some pesticides, like Proban, are systemic by design: The dog eats it, making his blood deadly to fleas.

Usually, the dose Princess gets is so small, relative to her body weight, that neither of you may notice a problem. But 15 to 20 times a day, the phone rings at the National Animal Poison Control Center in Urbana, Ill., with news of another animal who's been poisoned by a pet product. Besides the pesticides themselves,



K. Bendis '91

Current testing doesn't represent the old, infirm, or diseased pets we adore, who are less able to fight off toxins.

three common contributors to the problem are unusually sensitive pets, consumer misuse — and an ironic flaw in testing requirements.

The problem, if you can call it that, with current testing is that the laboratory dogs and cats on which pesticides are tested must, by law, be kept robust and healthy. Thus they don't represent the range of old, infirm, or diseased pets whom we adore, and who are less able to fight off toxins.

In the "consumer misuse" scenario, you shampoo Princess with one chemical to get rid of the fleas you can see, powder her with another to prevent recurrence, and then send her out to frolic in lawn chemicals. While any one of these doses may be calculated to metabolize quickly out of Princess' system, the combination of chemicals may be more than she can process.

If you're the loving owner of a fleabag, it'll come as no surprise to you that the perfect solution doesn't exist. Anyone who has tried to live and let live with fleas knows they're a pain in the ankles. Anyone who has

tried, without a PhD in chemistry, to decipher a flea-product label knows that's useless.

Two common families of flea and tick potions are organophosphates and carbamates, both potent nerve toxins (carbaryl, a common carbamate, may cause doggie birth defects). But these days, some less toxic remedies are becoming popular.

Pyrethrins, extracts of a mountain flower, are highly toxic to insects (and fish), but less toxic to mammals. Gram for gram, pyrethrins and synthetic "pyrethroids" are safer for mammals than carbamates and organophosphates, but they're not benign. In fact, Hartz Blockade, whose introduction in 1987 precipitated a rash of pet deaths, uses a pyrethroid. (They withdrew it, tested it, and found nothing wrong. It's back on the market.) Piperonyl butoxide (PBO), a synergist that multiplies pyrethrin's toxicity, is often added to pyrethrum products, making it more dangerous.

Also welcome in the green doghouse is the orange. D-limonene from citrus peels is used increasingly in flea

products; do-it-yourselfers apply the fresh peels, boiled or mashed. Warning: Kitties are sensitive to d-limonene, and their temperature may plummet after being fruited. Reviews of d-limonene's effectiveness are mixed.

An emerging hero of pet-loving environmentalists is the biological growth regulator methoprene (brand name Precor), which keeps fleas from maturing. Likewise, the Safer-brand flea and tick products, with pyrethrum, come well recommended.

TO INCREASE THE SAFETY OF PESTICIDES:

☞ Follow zealously the size and age instructions on the box. A smaller adult animal has less of everything it needs to cope with toxins. In young animals, the liver is too immature to metabolize the poisons quickly. And remember that any animal can have a bad reaction to a "safe" chemical. Avoid sprays that use hydrocarbon propellants (pentane, isopentane, butane, and isobutane), as these can cause fatal lung damage, says NAPCC.

☞ Start with a test patch or a light dose. The warning signs of a bad reaction are similar for all products, and may appear immediately or within a few hours. With organophosphates and carbamates, watch for drooling, vomiting, diarrhea, tremors, and constricted pupils. With pyrethrins and citrus oils, look for the above plus hypothermia, especially in cats. If you notice any of these symptoms, call your vet or the NAPCC, at (800) 548-2423. (There's usually a \$25 charge.)

COMPLETELY HARMLESS THINGS TO TRY:

☞ Flea combs. Drown the captives in soapy water.

☞ Vacuum carpets and furniture often. (Freeze the vacuum bag for 24 hours before reusing it, or captives will escape.)

☞ A cedar-chip-stuffed bed (for your pet).

RESOURCES

Dr. Pitcairn's *Complete Guide to Natural Health for Dogs and Cats* is an A-to-Z guide to natural pet care including — sharpen those needles — acupuncture. Lots of info on home cooking. Published by Rodale Books, \$12.95, 33 E. Minor St., Emmaus, PA 18098.

The New Natural Cat: A Complete Guide for Finicky Owners is another all-purpose guide, but for kitties. Published by Penguin, softcover \$14.45 ppd. from Penguin USA, Order Dept., P.O. Box 120, Bergenfield, NJ 07621-0120, (800) 331-4624.

The Natural Pet Care Catalog has Safer flea spray and methoprene, plus foods, toys, tools, and books. Free from All The Best Pet Care, 2713 East Madison, Seattle, WA 98112; (800) 962-8266; in Washington, (206) 329-1417.

Safer brand flea and tick products may be hard to find for a while, as the company was recently bought by Ringer, Inc. If you can't find them in hardware, health-food, or pet stores, try calling Ringer at (800) 654-1047.

☞ A light bulb suspended 10 inches above a pan of soapy water. (The suckers jump for the light and drown.)

☞ Garlic and brewer's yeast in your pet's food. Some folks swear by it.

☞ Vitamin B supplements to keep the suckers off your *own* ankles.

What happens to the toddler who gnaws on Doggy's fur after a flea powdering? Well, even if your child got sick, you probably couldn't successfully sue the maker.

In Florida, a man recently took pesticide-maker Zoecon to court, objecting that the warning label on a insecticidal dip he used on dogs in a shelter wasn't specific enough; and that traces of benzene in the dip had

given him debilitating aplastic anemia. The court ruled that since Zoecon was in compliance with EPA's labeling law, it could not be sued. (If this case is accepted and overturned by the Supreme Court, it could change the face of pesticide cans everywhere.)

Should we, who powder the cat once a week or give the dog a monthly flea bath, worry? Like your pal, each time you breathe in or absorb the compounds, you're giving yourself a little dose of poison. Because the EPA has received complete testing data for fewer than ten of the hundreds of active pesticide ingredients it registers, the effects of that dose aren't fully known. Further muddling the situation are the "inert" ingredients, which


may make up 99 percent of a product, but are considered trade secrets. They may be petroleum products tainted with carcinogenic benzene, or xylene, or methyl chloroform.

"The public perception is that there is no [health] risk if a product is approved by the EPA," says Karen Blake, co-founder of Help Eliminate Lawn Pesticides. "What the public has to understand is that there is a risk every single time."

So when you must dust or spray your pet, do it outside and stand upwind. Wearing a dust mask, goggles, and gloves wouldn't hurt. When you're done, go inside and fix up an extra special bowl of kibbles for your furry friend.



The Waste Oil Monster



Oil spills right in your neighborhood: small, un-newsworthy slicks of 10-W-40, drained from cars and dumped. This is the story of the *real* oil spill — the one that's in your driveway and sewer.

More than 780 million gallons of motor oil go in and out of American cars each year. When changed at a service station or quick-lube shop, the oil will enter a managed system, where it will be trucked off for re-refining or reprocessing. But only about half of the motor oil used annually takes this route. The other 367 million gallons keep environmentalists awake at night. This is DIY oil (Do-It-Yourself), the oil of the backyard mechanic who prefers to save some money and do the job at home. A 1981 survey by the U.S. Department of Energy found that 61 percent of all DIYs improperly dispose their used oil, burning it, dumping it, or finding creative reuses.

Oil poured on the ground doesn't evaporate — it sinks in. Poured down storm sewers, it begrimes pipe walls, gums up screens in the treatment plant, or may even bypass treatment and go straight into a waterway. DIYs often send their goop to landfills, most, if

not all, of which leak. The Coast Guard estimates that more oil dribbles from the land into coastal waters each year than is spilled in tanker accidents. All this oil re-enters the environment with a toxic load significantly higher than that of virgin crude. Used oil has traces of the lead, arsenic, cadmium, chromium, barium, and zinc that accumulate in the engine. By land or by water, oil oozes into groundwater supplies and the food chain.

Just one pint of oil can make a one-acre slick on a lake or stream, and the resulting film impedes the replenishment of dissolved oxygen by blocking out sunlight needed for photosynthesis. One quart of 10-W-40 will foul the taste of 250,000 gallons of H₂O. And for oil to disappear, it must be eaten by microorganisms. These tiny creatures need oxygen, too, and as they multiply to consume the oil, they can deplete the oxygen available to fish and other aquatic life.

Let no one say ours is not an oil-rich nation. We deposit more than 200 million gallons of it in our soil and waterways

BY JOHN GRASSY

every year, not counting what's drained from the likes of lawn mowers, weed whips, and boats. With so much oil running loose every year, how can it be we've heard so little about the problem?

Julie Stoneman, for five years the director of Michigan's long-running used-oil recycling program, says it's too easy to dump oil and get away with it. "Oil is a liquid," she says. "You can't see a mountain of oil, like you can plastic or paper. It's dumped in small quantities over wide geographic areas. You don't see it and you can't trace it."

MICHIGAN MOPS UP

Thanks in part to rising environmental awareness, used motor oil is beginning to get the attention it deserves — as both an environmental problem and a recyclable commodity. It wasn't so long ago that states were "oiling" dirt roads to control dust. But many of these states have now passed laws banning used oil from landfills, and they've instituted fines for improper disposal. A handful of states have even mounted impressive collection efforts.

Michigan's program started in 1979. Crude-oil prices were sky-high, and automakers were scrambling to design fuel-efficient cars. The Energy Crisis was in full bloom. Started as a volunteer project by Grand Rapids' non-profit West Michigan Environmental Action Council, the program's concept was simple: funnel DIY oil into the existing collection system serving business and industry. WMEAC staff and volunteers recruited service stations, quick-lube shops, and car dealerships — places already equipped to handle oil. A small budget of



\$25,000 paid for promotion materials, staff time, and a toll-free number directing DIYs to the nearest collection site.

When the program went statewide, it got a boost from Michigan State U's Cooperative Extension Service. Extension reps sponsored workshops on oil pollution and recycling, and recruited more collection sites. They packaged the tasks of education, recruitment, even building collection sites, into projects for youth groups such as 4-H. WMEAC's coalition grew to include public health departments, environmental groups, the state's soil-conservation districts, and the business sector, all working to educate DIYs and maintain public collection sites.

While the number of collection sites continues to fluctuate (currently there are 567 in 62 Michigan counties), the amount of oil diverted has climbed every year, proof that people will recycle oil when they know how. WMEAC figures show about 1.6 million gallons collected in 1990, from 800,000 in 1987. The program today is a monument to volunteerism, says Ms. Stoneman. "That has made us successful, but it's

also defined our limitations."

But even the most dedicated volunteers can't ease liability fears or tame the market, two factors that cause the fluctuating number of collection sites. In Michigan, as in most states, collectors are liable for used oil's safe passage from "cradle to grave." Thus you can be stuck with cleanup costs if the truck that picks up your oil does a cartwheel 100 miles away. The other big fear is contamination. "If someone dumps something other than oil into your tank, you're responsible for its proper disposal," notes Ms. Stoneman.

For instance, Meijer Inc., a Grand Rapids-based retail chain, was a major player in WMEAC's collection web ... until last summer. Citing liability concerns and vandalism at unsupervised collection sites, the retailer shut down its 19 collecting tanks, which had brought in more than 20 percent of the program's DIY oil.

SLIPPERY ECONOMICS

The economics don't help. These days, there's simply no money in collecting used motor oil from the public. The market value of used oil rises and falls with the price of virgin crude. In the late 1970s and early '80s, high oil prices spurred interest in used oil. The haulers that picked up used oil from service stations were *paying* for it. The private sector's profit motive was good



MORE OIL DRIBBLES FROM LAND INTO COASTAL WATERS THAN IS SPILLED IN TANKER ACCIDENTS ... THE AMOUNT DUMPED IN MICHIGAN EACH YEAR IS ROUGHLY EQUIVALENT TO THE EXXON VALDEZ SPILL.



PAUL CROUSE

Changing your oil doesn't have to be a bad experience; use the right tools and close your mouth.

news for recycling: Drop off that dirty old oil at *my* tune and lube? Sure! Then the bottom fell out of world oil prices during the "oil glut" of the mid '80s. Before long, haulers were *charging* to take used oil away. With the brief exception of the Persian Gulf War, the value of used motor oil has been sliding ever since, as has the number of collection sites in Michigan.

Volunteer operations are especially vulnerable to legal and financial perils. "Most of the newer recycling programs are institutionalized within state government," says Mr. Johnson, who looks to programs in Florida and Maryland as models of stability. Despite its successes, WMEAC is working to convince state officials to take the reins and develop a more comprehensive program. Only about 12 percent of all DIY oil was collected last year; the amount dumped in Michigan each year is roughly

equivalent to the Exxon Valdez spill, according to WMEAC.

Florida looked at its used-motor-oil pollution and jumped. State environmental officials don't mince words about the potential threat of DIY oil: Groundwater lying just six or seven feet underground provides more than 90 percent of the state's drinking water.

Kicking off the program last fall, then-secretary of Florida's environment bureau Dale Twachtman said, "We estimate

that around seven million gallons of oil from do-it-yourself mechanics are improperly disposed of each year in Florida. That's the kind of battering no state can take over a long period."

Florida backed its words with action, launching an aggressive public-education campaign (including a school-based program) and local and county-wide collection programs. In 1988-89, over \$1 million in grants went out to 54 counties, six cities, and one Indian tribe. "Everyone who requested a grant was funded," says Betsy Galocy, coordinator of the oil program. "The result was about 200 new collection sites." Counties and municipalities that operate collection sites also receive partial liability protection from spills or contamination, courtesy of the state.

Curbside collection programs now operate in Charlotte and Hernando counties; a third coun-

ty, San Luce, features a mobile oil-collection vehicle, which serves 11 pickup points each month. Augmenting the state's efforts, the oil biz has opened its tanks to DIYs. About 450 of Florida's 650 collection sites are Mobil, Amoco, BP America, and Texaco service stations.

Hard figures aren't yet available on collection rates, but the program barrels on. Another million dollars will be disbursed in July, targeting major metropolitan areas, the 13 counties that didn't apply last year, and — a serious problem for Florida — boat marinas.

BURN IT OR BOTTLE IT

The durable qualities that make motor oil a fine lubricant also make it ideal for recycling. Motor oil never wears out. Never. It just gets dirty. During its workout in the crankcase, additives in the oil may break down, and the oil darkens as it collects contaminants. Through the process of re-refining, these impurities are removed by heating and filtering, yielding "new" oil.

It used to be that virgin crude oil required no special processing — most oil in the world was of motor-oil quality when it came out of the ground. But as we've dipped deeper into the world's reserves, overall quality has declined. Producing motor oil from today's crude is a costly, elaborate process: 42 gallons of crude oil yield just 2.5 quarts of virgin motor oil, along with some other products. Re-refining, on the other hand, is much more efficient: Only one gallon of used oil is needed to produce the same 2.5 quarts of quality lu-

bricant (plus by-products).

However, the vast majority of collected oil isn't re-refined. It's reprocessed. Reprocessing involves blending the used oil with virgin stock to make industrial heating fuel. About 80 percent of the DIY oil collected in the U.S. takes this route. Reprocessing has benefits — it reduces virgin-oil consumption and saves money — but in the eyes of some environmentalists, burning high-quality motor oil is no victory for recycling. "These are our finest-quality lubricating oils," says Ms. Stoneman. "Reprocessing is better than dumping, but reprocessing is using that oil only once [more]."

There's a good explanation for the mere trickle of oil that's re-refined: Only seven re-refineries have been running in North America, and just three were considered sizable operations with current technology. And only one of those, Evergreen Oil of Newark, Calif., is in the U.S. The Evergreen plant takes in about 12 million gallons of used oil each year.

U.S. re-refining took a quantum leap this past April, though, with the opening of the Safety-Kleen Corp. re-refinery in East Chicago, Ind. Outfitted with the latest technology and capable of processing 75 million gallons of

used oil annually, the plant is the largest re-refinery in the world, and roughly triples U.S. capacity.


TROUBLED PAST, CLOUDY FUTURE

Small, independent re-refineries flourished years ago, and memories of the sub-standard products of that time haven't disappeared. Skeptics question the overall consistency of "used oil" and say it can't possibly be as reliable as new stock. But a spokesman notes that Safety-Kleen oils have passed the toughest tests, including the specifications for U.S. military machinery.

New York State is among the fans of re-refined. In 1990, the state bought more than 76,000 gallons for use by municipalities and school districts. "It was low bid, and it met our specifications," says Steve Pryor, a purchasing officer in Albany. "We didn't do anything different in purchasing procedures; the product simply became available."

Here comes the bad news. Just as things are finally gearing up, a storm of federal action could alter the used-oil scene. The EPA will soon decide whether to list used motor oil as a hazardous waste. If it is tagged hazardous, handling costs and risks will be higher. The

petroleum industry's spirit of volunteerism might fade, hurting collection efforts — the industry has already suggested as much. Pending legislation in Congress will, if acted on, affect all aspects of oil, from production to recycling. One plan would direct the EPA to set mandatory recycling levels for manufacturers.

For used-oil recycling to gain even more momentum, says Julie Stoneman, action is needed on all fronts at once. Leaders at the state and local levels need the facts about used-oil pollution, and they need models for collection programs. The business sector needs to participate at both ends of the recycling cycle. "That means taking DIY oil if you're a service station, and stocking re-refined oil if you're a major retailer," she says. And finally, more do-it-yourselfers need to realize just what it is they're throwing away. Motor oil may originate in the Earth, but after refining and a 7,000-mile run in a crankcase, it shouldn't be sent home again. 

John Grassy's work has appeared in The Grand Rapids Press, Grand Rapids Business Journal, and other Michigan publications. A resident of Grand Rapids, John is a do-it-yourselfer who takes it back.

HOW TO GET RID OF YOUR OIL

The do-it-yourselfer's finest moment: Emerging from beneath your car, you stand wiping your hands on your pants, eyeing the flimsy plastic tub filled with dirty oil. It was easy! You saved money! Now you just have to figure out what to do with the tub.


Ideally, you would have checked out your options before you had oil on your hands.


Call your state environmental or natural-resources department to find out if there's an oil-recycling program and, if so, where to find the nearest collection site. Only 12 states have formal recycling initiatives, but virtually every state in the union has a contact person for used oil. A few states, such as Colorado and Idaho, house their contact person in the state health department or hazardous-waste division.


If there's no program, start calling service stations in your area, including "quick lube" shops and automotive centers linked to retailers, such as K-Mart or Sears. Let them know you want to do the right thing with your old oil.


"We tell people to talk with a garage they frequent," says Tim Johnson, coordinator of Michigan's oil-recycling program. "Just call around. Beg and moan if you have to. A station may do it grudgingly, with the hope that you'll never tell anyone else they took it from you."

FOLLOW THESE DO-IT-YOURSELFER TIPS:

 Containers should seal tightly. If you can't use the jugs your new oil came in, milk jugs, soda bottles, and very clean anti-freeze bottles will do.

 If you find a willing garage, go during business hours, and don't just drop your cargo and leave. They may have agreed to take the oil, but many garages will ask that you keep your containers.

 Synthetic oils can be recycled with the usual stuff.

 Don't change your oil so much! While many people think oil needs changing every 2,000 or 3,000 miles, auto makers are upping the ante to about 7,500 miles. Read your manual. You may be throwing out oil too soon. — J.G.



WINDSURFER.COM

77

Toxic Tour of TEXAS

ARNOLD AT THE TEXAS CITY DIKE

Surfing in this water?
Well, it's all I got. It could be better. It certainly would be nice if you were assured that it was not harmful to your health. If there were some sort of catastrophe, I wouldn't sail here. Say, if there was a big spill or a chemical thing, you know, I'm worried about that.

— Tom Arnold

At the Texas City Dike, lead levels are six times the Environmental Protection Agency's aquatic standard. Copper is four times the standard, nickel thirteen times, and silver ten times.

— Water Sampling Report,
May 1990
North Water District
Laboratory Services

Texas prides itself on being number one. Often, it is. Take toxics. Because it has the nation's largest concentration of oil refineries and chemical plants, Texas ranks first for the amount of carcinogens released into the environment.

With a Mamiya medium-format camera, I toured toxic Texas. My guides were farmers, priests, mothers, ranchers, engineers, and teachers working to protect their children and communities from exposure to hazardous waste. They have reversed misguided governmental decisions and halted harmful industrial practices. They have changed their personal habits and attitudes.

So must we all, if we're going to maintain the basic life-sustaining elements of clean air, land, and water.

— S.S.

TEXT AND PHOTOS BY SHARON STEWART



KEN SIRMONS, FRUIT AND VEGETABLE VENDOR SELLING NEXT TO MOTEC, TEXAS RESURFACING

Why would it be my health? I'm not over there in it. It don't ever come over here. If it was gonna hurt anybody, they'd shut it down.



ON SITE.

They've got all them alert things on top. — Ken Sirmons

JETER STEGER, RESIDENT OF CARVER TERRACE



Most of the people who live out here were aware that this had been the site of a creosote-treatment plant. They were not aware of the hazards that were involved with the place being reclaimed for residential use. And they were not aware of Texas Water Commission studies that revealed some of the inherent problems of being exposed to creosote. Because there had been no problems, nobody was concerned. I, at that point, had kidney failure.

— Jeter Steger, resident of this EPA - designated Superfund site, and a ten-year recipient of dialysis treatment.

We are recommending a health study be performed on the residents of Carver Terrace.

— Carl Hickam, Senior Regional Representative Agency for Toxic Substances & Disease Registry

LAILEY SCZEPANIK AND DAUGHTER, KATJA



I have eight kids, and I live next to two pits [containing uranium mill tailings]. I figured I had better have my well water tested. The Bureau of Radiation Control came and said, "What is your reason for thinking you need your water tested?" Three months later they called me and said, "Do not drink your well water. We are sending you a report." I have been drinking this water for nine years. What am I going to do, truck in water for a family of ten?

— Lailey Sczepanik, Member
Panna Maria
Concerned Citizens

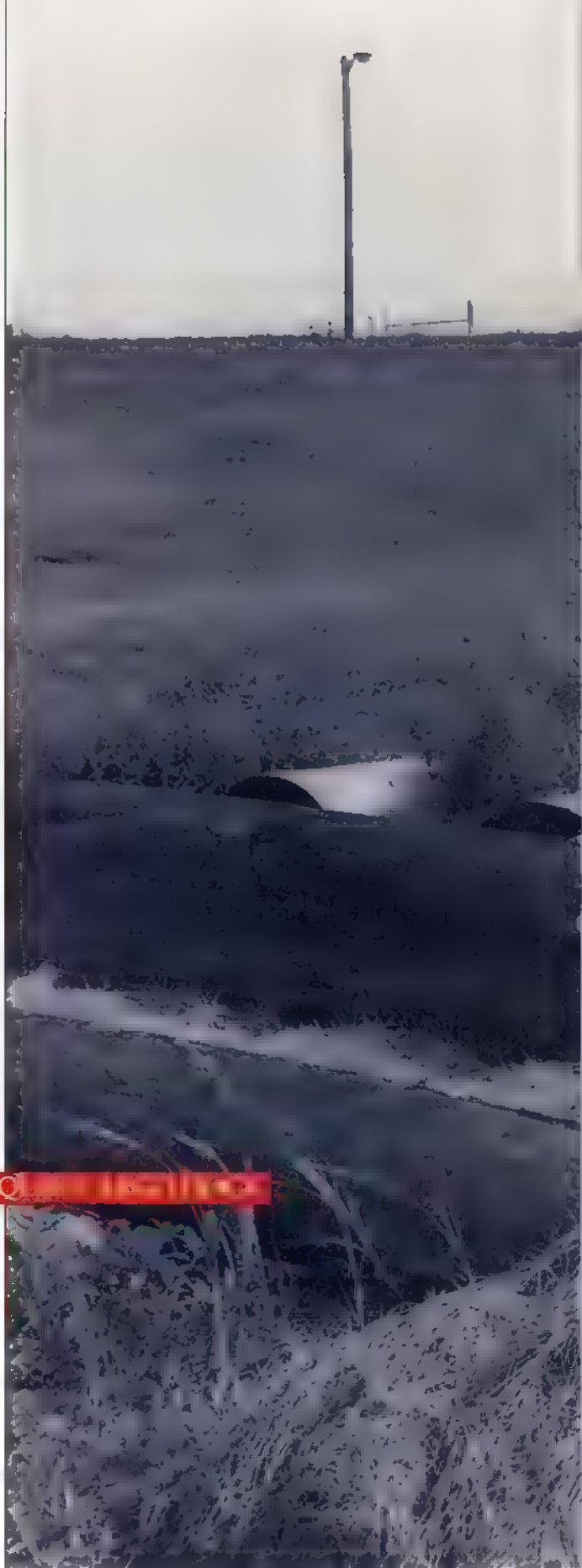
Someone from our office called her? I can't imagine anyone from our office calling her.

— Philip E. Shaver, Chief
Uranium & Nuclear
Waste Management
Division of Licensing,
Registration & Standards
Bureau of Radiation Control
Texas Dept. of Health

HAY TRAP, TEXAS CITY LIQUOR DISTILLERY

That's the hay trap, what the Texas Water Commission calls a "state-of-the-art" water-filtration system. Hay, just like horses and cows eat. All the industries dump into this ditch, and it all goes straight from the ditch into Galveston Bay... except through that "state-of-the-art" filtration, that hay.

— Rita Carlson, President
Galveston County
Environmental Division



Hay bales are often used as final treatment for oils and solids



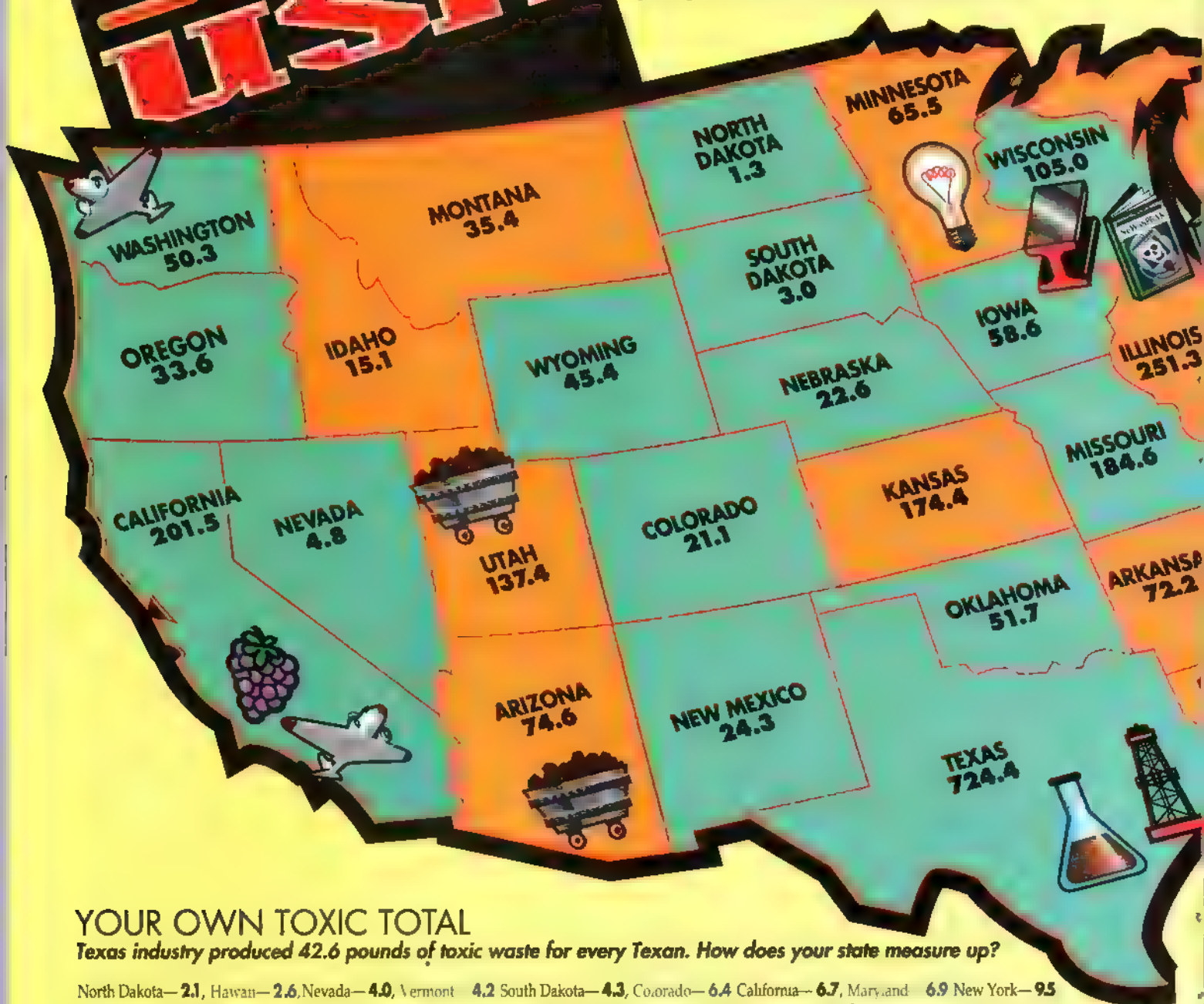
that come from contaminated storm waters. — John Ward, Water Quality Manager, Texas Water Commission, District 7

TOXIC TOWERS of the USA

Photographer Sharon Stewart focused on the toxics in her home state of Texas (p. 38). Now, let's step back for a wide-angle view. It's always heartening to find that your state comes out smelling like a rose. But before you hang out the banners, meditate for a moment on one educator's profound pronouncement: We're all Ohioans.

Ohio, Texas, and other hard-working states look dirty and undesirable because they bear the burden of processing all the coal and petroleum products that the "clean" states use. In reality, we all bear responsibility for the statistics in those sacrificial states — just as anyone who buys bread bears some responsibility for Nebraska's pesticide problem, and anyone who eats California rice plays a part in their drought.

So if you throw a party to celebrate life in a pristine state, at least keep the lights low — someone across the border may be paying the environmental half of the electric bill.



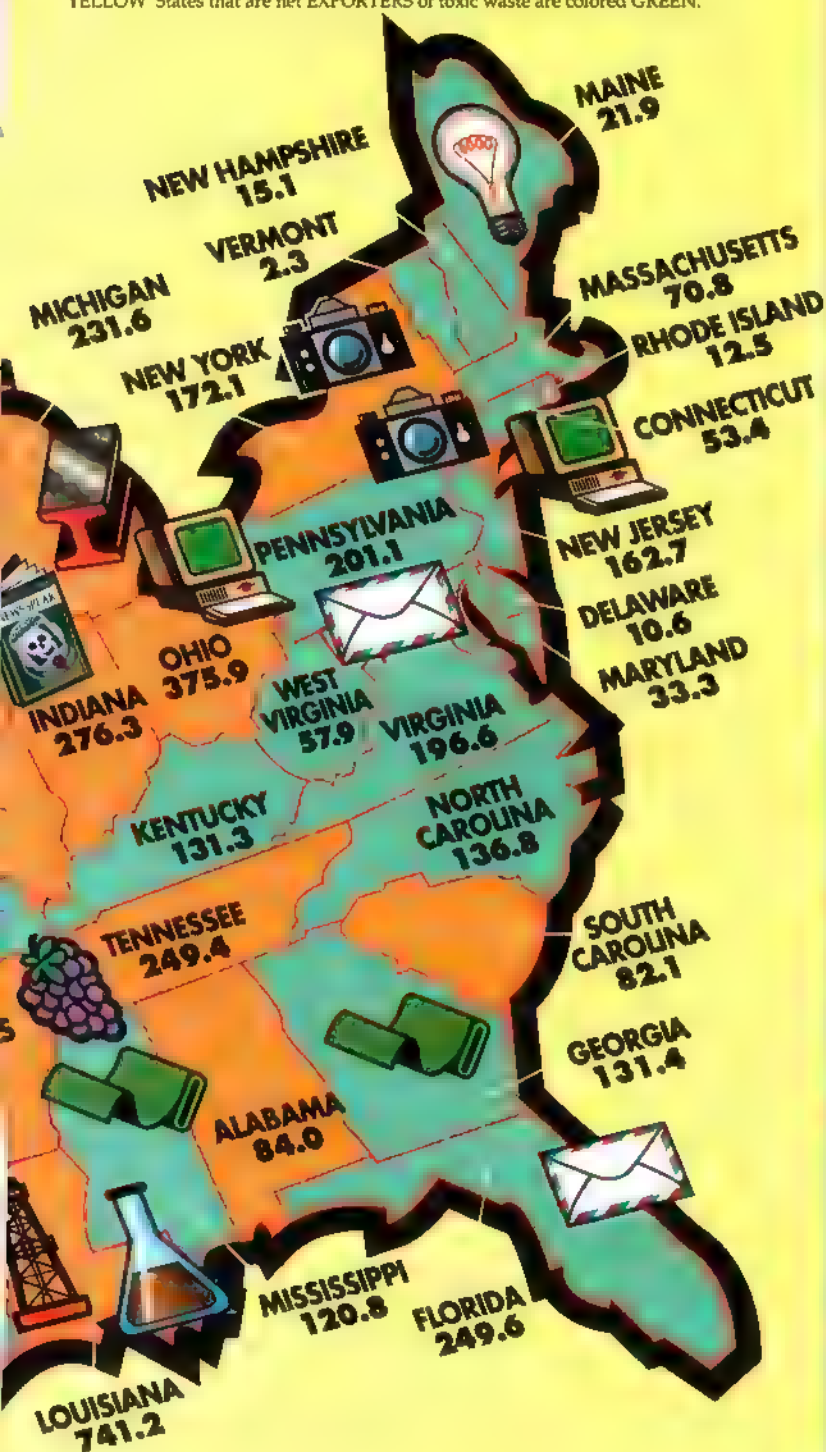
YOUR OWN TOXIC TOTAL

Texas industry produced 42.6 pounds of toxic waste for every Texan. How does your state measure up?

North Dakota—2.1, Hawaii—2.6, Nevada—4.0, Vermont—4.2, South Dakota—4.3, Colorado—6.4, California—6.7, Maryland—6.9, New York—9.5, Washington—10.3, Massachusetts—11.7, Oregon—11.8, Rhode Island—12.5, New Hampshire—13.6, Nebraska—14.3, Minnesota—14.9, Idaho—15, Delaware—16, New Mexico—16.1, Connecticut—16.3, Oklahoma—16.4, Pennsylvania—16.9, Maine—17.8, Florida—19.2, Arizona—20.4, North Carolina—20.6, Alabama—20.8, New Jersey—21, Iowa—21.1, Wisconsin—21.2, Illinois—21.9, South Carolina—23.5, Michigan—24.9, Georgia—30.2, Arkansas—30.7, Virginia—31.7, West Virginia—32.2, Ohio—34.6, Kentucky—35.6, Missouri—36, Texas—42.6, Montana—44.3, Mississippi—46.9, Alaska—48.1, Indiana—49.8, Tennessee—51.1, Kansas—70.4, Utah—79.9, Wyoming—100.2, Louisiana—175.6.

NUMBERS ARE TOTAL TOXIC RELEASES FOR EACH STATE — IN MILLIONS OF POUNDS

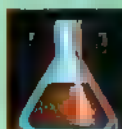
States that are net IMPORTERS of toxic waste from other states are colored YELLOW. States that are net EXPORTERS of toxic waste are colored GREEN.



Source: The EPA's "Toxic Release Inventory," which lists manufacturers that handle at least 50,000 pounds of any of 322 chemicals. The Inventory excludes federal facilities, even though the federal government is the country's largest producer of hazardous waste. It also excludes "small-quantity generators" of hazardous waste (see Index, p. 63).

CAPTAINS OF INDUSTRY

Top toxic emissions in 1988 for 12 selected industries



CHEMICALS

American Cyanamid Co., Westwego, LA
176,418,250 pounds
Du Pont Beaumont Works, Beaumont, TX
111,899,929 pounds



PRIMARY METALS

Amax Magnesium, Tooele, UT
107,750,090 pounds
Asarco Inc., Hayden, AZ
35,930,150 pounds



PAPER

ITT Rayonier, Inc., Fernandina Beach, FL
54,369,100 pounds
Westvaco, Luke, MD
9,107,754 pounds



TRANSPORTATION

General Motors, Van Nuys, CA
3,651,260 pounds
Boeing Commercial Air, Everett, WA
3,048,905 pounds



FABRICATED METALS

Ajax Metal Processing, Warren, MI
4,572,313 pounds
Plateco, Reedsburg, WI
3,973,750 pounds



ELECTRICAL

3M Magnetic Media, Hutchinson, MN
16,645,979 pounds
General Electric Co., Pittsfield, MA
4,839,169 pounds



PETROLEUM

Citgo, Lake Charles, LA
11,153,343 pounds
Amoco, Texas City, TX
9,092,476 pounds



MACHINERY & COMPUTERS

Lincoln Electric, Euclid, OH
3,657,194 pounds
UNC Naval Products, Uncasville, CT
1,366,630 pounds



FOOD

Delano Growers Grape Products, Delano, CA
9,618,700 pounds
Kraft Food Ingredient, Memphis, TN
6,062,300 pounds



PHOTOGRAPHIC

Eastman Kodak, Rochester, NY
22,578,939 pounds
Anitec Image Corp., Binghamton, NY
4,544,290 pounds



PRINTING

Maxwell Communications, Broadview, IL
4,281,006 pounds
R.R. Donnelley & Sons, Warsaw, IN
3,949,052 pounds



TEXTILES

Gencorp Polymer Products, Columbus, MS
5,648,672 pounds
King Finishing Co., Dover, GA
3,459,954 pounds

GRAPHICS BY SCOTT MacNEILL

GOOD WOOD

Buffeted by TV shots of razed rain forests and calls for boycotts, it's hard for a conscientious wood consumer to do the right thing. Demand is rising for responsibly grown tropical wood. But whom can you trust to supply it? And where can you find it?

Almost 20 years ago I came into possession, by rather dubious means, of a handsome teak plank. I was working in a Maine boat yard and in the spirit of the day, a fellow employee and I "liberated" the teak from a fat lumber pile, in compensation for poor working conditions and perceived injustices. The five-foot board was straight grained and knot free, measuring two inches thick by about ten inches wide. Stenciled boldly across one face was the name of its country of origin: Made in Thailand.

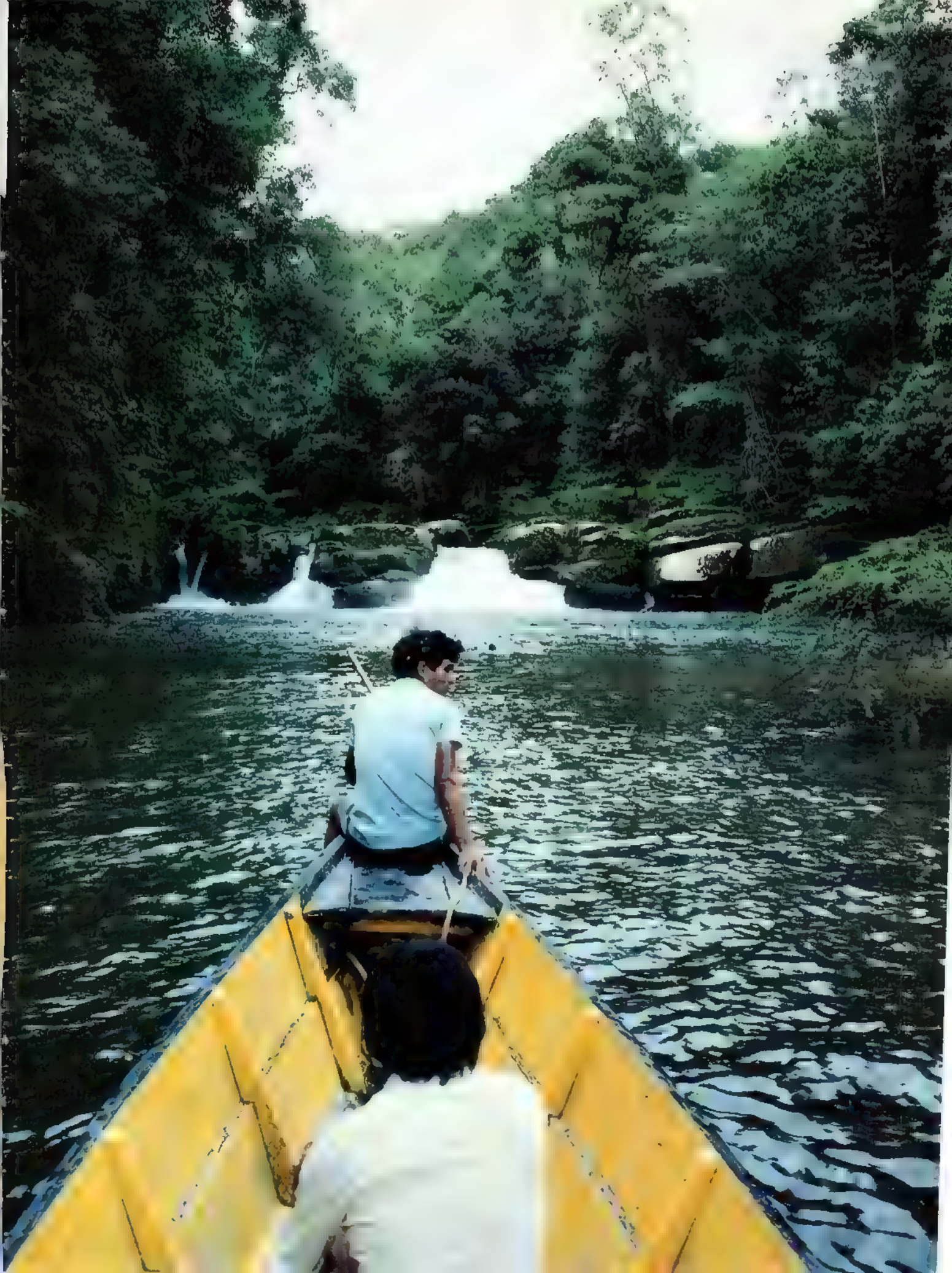
Over the years, I toted my teak from shop to shop like a precious heirloom, nibbling off small chunks for special woodworking projects — a pair of canoe decks here, some knife handles or a dovetailed box there. Teak is an extraordinary wood to work. It carves crisply and sands to the texture of fine leather. Like a jeweler sweeping gold filings, I would

have suctioned the sawdust if I thought I could reconstitute it.

One odd-sized cant remains in my shop, awaiting an appropriate application. But my reverence for the material is now tempered by other, more sobering considerations. I rationalized my petty teak heist, but now I find it harder not to feel some complicity in the devastation of the tropical rain forests. I won't quit using tropical woods. But choices I once made blithely — based only on hardness, color, and price — must now account for the method of harvest and its effect on the surrounding forest. Buying responsibly grown wood won't change "cut-and-run" logging practices overnight. But it's a good place to start.

Looking for good wood:
The author makes his way, by dugout canoe, to Peru's Pucallpa Valley.

TEXT AND PHOTOS BY SCOTT LANDIS



Buying good wood won't change "cut-and-run" logging practices overnight. But it's a good place to start.

WOOD GROWS ON TREES!

So, what's the problem? After all, wood is a renewable resource. It really does grow on trees. It doesn't take much effort to convert standing timber into lumber that can be made into an elegant violin or a sturdy home. And when its useful life is over, wood degrades completely, replenishing the soil from which it emerged.

Would that it were so simple. The world's forests are being mined like coal fields, at rates that far exceed their ability to regenerate. In the

tropics, where thin soil cover and extremes of climate contribute to soil erosion and inhibit the forests' ability to recover, the effects of overcutting are more acute than in North America. Seeds that can survive in temperate zones for centuries last only a few weeks in the tropics' hot, moist environment.

For millions of years, vast tropical forests have helped regulate the Earth's climate. In the last 50 years, almost half of those forests have been destroyed. Barring some dramatic change, most of the rest will be gone in the next few decades. According to Norman Myers, author of *The Primary Source* (W.W. Norton, 1984), it may take up to a thousand years to restore a primary rain-forest ecosystem after it has suffered the gross disruption of mechanized logging.

Where do the cuttings go? "More than half of all tropical timber felled finds its way into the main market for specialist hardwoods," notes Mr. Myers. "The average American consumes about 1-1/2 tons of wood per year, or as much by volume as would fill the space occupied by an average dining-room table."

Timber is not the only culprit. Worldwide, forests are also being

cleared to supply newsprint and plywood for developed countries, or to provide firewood for local residents, who need the produce they can grow on a parched plot of land more than they need the trees. In a recent study conducted in Colombia, wood harvesting was held directly responsible for only about 25 percent of deforestation (and that is divided between fuelwood consumption and lumber). The rest was written off to agriculture.

In Southeast Asia, logging for wood products is the primary cause of deforestation. And even where it's not, timber is almost always an important piece of the puzzle. In the tropics, the most desirable species are often widely dispersed — in some cases, less than one tree in every four acres. Roads that are built to remove these few marketable specimens provide access for landless peasants, who cut and torch the remaining timber to make way for corn or cattle.

CONSERVATION AND CLEARCUTS

To arrest deforestation, environmental groups are turning to the marketplace. Preservation was only recently measured in acres of protected parkland. Now, it is al-

PLASTIC WOOD: WHAT'S IT GOOD FOR?

Let me say for the record that if we could closed-loop recycle all our plastic packaging — make our PVC oil bottles back into oil bottles and our HDPE milk jugs back into milk jugs — there probably would be no plastic lumber. But for the moment, let's relegate that thought to the sweet-dreams file, and face this fact:

There is plastic lumber. And in some instances, we can use it to replace tropical and old-growth woods.

Every manufacturer's recipe for plastic lumber is a little different, but the basic idea is to cram semi-melted plastic bottles and other waste into a mold the shape of a two-by-four, a

four-by-four, or some other standard-size wood product. The molded plastic is then cooled in a water bath.

When plastic lumber was first conceived (in the 1970s, the Dutch invented the predecessor to the ET-1, the popular "ram it in there" molding machine), there was talk of using it to build houses. It took a little while for folks to realize that plastic not only is a bit of a fire hazard, but also it weighs twice as much as wood, and has only a fraction of wood's stiffness, depending on the type of plastic.

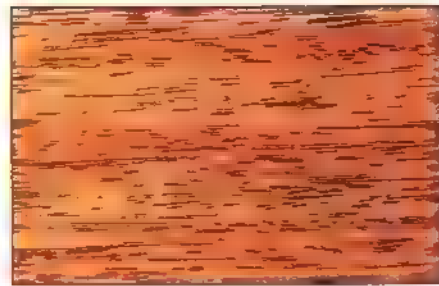
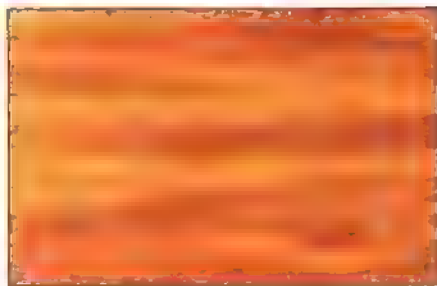
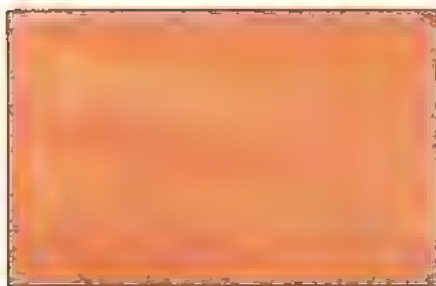
However, plastic lumber does have outdoor uses in which it seems unparalleled — so far. The tender age of plastic lumber means no

one knows how it will perform over time.

The list of selling points is impressive: Plastic never needs paint. Unlike treated woods, it won't leach toxic arsenic or pentachlorophenol compounds into your garden (although early indications from an unfinished Rutgers University study are that some plastics will leach some toxics — in amounts that are far smaller than treated wood). Plastic wood's resistance to sunlight is high; its resistance to termites and borers is beyond high. Confidence that plastic will long outlast treated wood is high, even among researchers at the Rutgers University Center for Plastics

Recycling Research, where lumber samples are crushed in vises and otherwise tortured. And as the advertisements love to point out, plastic lumber won't give you splinters.

If you want to see your old milk jugs put to use, here are some tips for buying and working with plastic lumber. Rutgers researcher Dr. Tom Nosker, who built a porch with the stuff, says that plastic can be cut, nailed, and bolted just like wood. However, you should use a carbide-tipped saw blade for the bits of aluminum bottle-cap and other crud that you're bound to encounter. And because plastic isn't great at holding a sustained load, use one-third more supports than



A good wood sampler, from left to right: Caimitillo, Chontaquiro, and Tornillo.

most universally tied to "sustainable development." If this ill-defined buzzword sounds contradictory — or at least antithetical to conservation — it *has* opened an important dialogue between erstwhile antagonists: ecologists, loggers, and consumers. By embracing economic development, environmentalists are dangling tangible incentives before developing nations, which may spur them to manage wisely their woodlands.

Because of its diversity, a tropical forest requires a pragmatic new thinking that considers *all* forest-management techniques. The familiar practices of clearcutting and even-aged management (where a multi-aged, natural forest is replaced by a plantation) have a sordid reputation. But the assumption that clearcutting is

universally destructive is contradicted by recent experiments in Peru.

At the Yanesha Cooperative in central Peru, which I visited in 1989, narrow strips of timber are logged, allowing sunlight to penetrate the forest canopy. This "strip-shelterbelt" cutting method hastens natural regeneration from the adjacent forest. Here, and in a handful of other projects around the world, long-ignored indigenous forestry practices and natural forest-management techniques are being rehabilitated — not as noble gestures but as viable economic models.

Forestry plantations are also attracting attention. An even-aged monoculture of trees has all the diversity of a southern Florida retirement community. But plantations cultivated on already degraded land can simul-

taneously relieve pressure on the remaining natural forest and provide local jobs. Plantations favoring a mix of native species are particularly promising, because they attempt to reestablish natural biological diversity. Also, newly planted native species stand the best chance of surviving.

Yet new and renewed forest-management techniques have been overshadowed by a call to boycott tropical woods (and wood products). Advocated most strenuously by the Rainforest Action Network (RAN), a boycott would forbid imports of all tropical woods — from the luan plywood made in the Philippines (one of the most commonly used materials in the building trades) to the teak found in genteel garden benches. The RAN boycott was recently adopted

you normally would. Consult your local building code before you buy so much as a nail — even if they've never heard of plastic lumber, building officials may have load and spacing requirements for decks, piers, and other constructions.

Making an informed purchase is going to be difficult. As yet, there are no industry standards for measuring the structural properties of plastic lumber. And because one manufacturer may use LDPE grocery bags, while another uses HDPE milk jugs with polystyrene for extra stiffness, properties can vary widely. Until there are standards, ask dealers for recommendations from customers who have used

the product. Don't be wowed by fancy mixtures of wood chips, fiberglass, or anything else — only time and experience will reveal good recipes.

But to back up a step, even making an *uninformed* purchase is likely to be difficult. Convincing retailers to carry plastic lumber hasn't been the top priority of manufacturers, so you'll have to call a manufacturer near you for retail information.

— Hannah Holmes

SOURCES FOR PLASTIC WOOD

Coon Manufacturing
P.O. Box 196
Dept. GM
Spickard, MO 64679
(816) 485-6299

Eaglebrook Plastics
2600 W. Roosevelt Rd.
Dept. GM
Chicago, IL 60608
(312) 638-0006

Hammer's Plastic Recycling
P.O. Box 182
Dept. GM
Iowa Falls, IA 50126
(515) 648-5073

Laminations/Santana Products
301-11 Cliff St.
Dept. GM
Scranton, PA 18503
(800) 368-5002

National Waste Technologies
934 Easton St.
Dept. GM
Ronkonkoma, NY 11779
(516) 588-4545

The Plastic Lumber Co.
209 S. Main St.
Dept. GM
Akron, OH 44308-0075
(216) 762-8989

Plastic Tree Poles
8560 Vineyard St.
Suite 510
Rancho Cucamonga, CA 91730
(714) 989-7685

Polymerix
4 Frassetto Way
Dept. GM
Lincoln Park, NJ 07035
(201) 633-7600

Recycled Plastics Industries
1820 Industrial Dr.
Dept. GM
Green Bay, WI 54302
(414) 468-45

With consumers clamoring for good wood, the market is ripe for overly optimistic promoters.

by Arizona, the San Francisco Board of Supervisors, and by several smaller cities.

A boycott is one way wood users can make a principled protest against deforestation. But the issue is more complicated than most consumer boycotts, which typically focus on a single company, commodity, or country. According to the Rainforest Alliance, tropical timber is a \$7-billion-a-year business. The U.S. is only the third largest consumer of tropical hardwoods, after Japan and Europe. If tropical countries can't sell their wood here, they'll sell it elsewhere.

More important, because the U.S. imports more processed-wood products than either Japan or Europe, a boycott would remove whatever leverage North American consumers have to enhance the value of the tropical forests, and might speed the conversion of forest to field. And if we replace tropical woods with temperate species, North American forests would be stripped at a more drastic rate.

DEALING GOOD WOOD

One way to protect tropical forests is to buy wood from well-managed preserves. But where can you find such "ecologically correct" wood, whom can you trust to supply it, and how much will it cost? These are only a few of the questions that confront advocates of sustainable development, who must match a severely limited supply with a growing demand for good wood.

With consumers clamoring for good wood, the market is ripe for overly optimistic promoters and downright charlatans. Don't think you'll find the stuff at your local lumberyard. Well-managed forests (tem-



Loggers use muscle and oxen to take trees from Peru's forest.

perate or tropical) are scarce, scattered like rosewood trees in the Atlantic forest of Brazil. A handful of projects, like the Yanesha Cooperative in Peru, have been extolled for their natural forest-management practices. Yet so far, the Co-op has exported just three scant containers of wood, totaling slightly more than 20,000 board feet — barely twice the amount that goes into your average, single-family house.

Despite the demand for it, a label of "sustainability" may not be worth the paper it's written on. Daryl Braun told me he could "buy almost any type of lumber you can name with a label that 'guarantees' its sustainability." Mr. Braun is president of D.M. Braun & Company of Santa Fe Springs, California. The company makes indoor/outdoor furnishings for parks, shopping malls, and office buildings. He spent the better part of six months researching the world timber market, trying to find "what's right, what's wrong, what's out there, what's good wood."

Mr. Braun rejected projects like the Yanesha Co-op because his manufacturing business requires a dependable supply. (Most of the small, community-based ventures in Central and South America are trying to harvest a wide range of lesser-known species.) He has tried all the familiar woods — oak, poplar, teak, redwood — but he now prefers jarrah (*Eucalyptus marginata*), an extremely dense, rot-resistant wood, grown only in temper-

ate forests and plantations in Western Australia. He's satisfied that the wood is responsibly harvested.

Peace of mind doesn't come cheap. Jarrah costs roughly 50 percent more than mahogany. "I've been losing business trying to sell [products made from jarrah]," Mr. Braun says. "Many folks simply don't care about sustainability. They just want a good, hard wood for less money."

According to John Curtis of The Luthier's Mercantile, the California company that arranged the first export of Yanesha woods, current wood prices do not account for the true costs of harvesting the timber in a way that sustains the forest — and the people who live there.

The price tag for raw tropical wood does not include the cost of building logging roads, Mr. Curtis explains. Nor does it cover the real-world cost of tropical logging operations that destroy as much as 75 percent of the remaining forest — all in the quest for a few saleable trees. "If you're going to ask people to tiptoe around, not bruising any trees, you have to pay them for their effort," says Mr. Curtis.

For their most recent shipment of seven types of lesser-known woods, the Yanesha Co-op received \$1.20/board foot, or roughly three times the local value. That's the kind of incentive it takes to fend off unscrupulous operators and other demands on the forest. It cost The Luthier's Mercantile about the same



At Yanessa, sawing trees into lumber adds value to the product.

amount to lug the wood over the Andes and ship it to the U. S. Ultimately, Mr. Curtis says, "The public will be responsible for supporting sustainable yield — as long as they're willing to pay the price, it'll fly."

WHAT YOU CAN DO

Caught between a boycott and a good-wood supply that's barely trickling to our shores, a responsible wood consumer has a tough time trying to do the right thing. But there are several steps you can take — right now — which will help conserve tropical forests and encourage responsible management techniques.

•First, *use less* and choose carefully

— we are consuming more wood than we know how to grow. Wherever you can, use plywood or veneered particleboard instead of solid wood. (Although they're made of wood fiber and glue, "engineered" wood products use valuable materials to advantage.) A traditional boat-building wood such as teak should be reserved for applications that *require* its formidable rot-resistant properties — boat decks yes, interior paneling no. Try to use plantation-grown woods and avoid seriously depleted species, such as ebony, Brazilian rosewood, or old-growth redwood.


•Pull the nails, scrape off the old glue, and *use recycled wood* wherever possible. Look for old buildings slated

for demolition as well as packing crates and pallets, many of which are made of tropical hardwoods.

•*Experiment* with unfamiliar species. There are hundreds of beautiful tropical timbers that have barely been tested. *Patronize* those dealers and manufacturers who are trying to establish sources of good wood. Ask them to verify their sources and encourage them to find more. Also, ask your regular suppliers where their material comes from, and don't accept any offhand guarantees. Try to bring them into the process: Tell them that you will buy good wood wherever you can find it.

•*Support* environmental organizations that are actively promoting sustainable development, debt-for-nature swaps, non-timber forest crops (such as rubber, chicle, and nuts) or independent certification of wood from well-managed sources. Wood certification is in its infancy in the U.S.; the Rainforest Alliance (212-941-1900) is the first to take up the challenge with its "Smart Wood" program, launched this year.

•Finally, expect to *pay more*. Whether you do so voluntarily by buying wood from well-managed sources, or whether you wait for scarcity to take effect, the price is going up.

You won't find good wood at your local lumberyard, but it's coming. If enough people vote with their wallets, it will make a difference to the survival of one of our most precious resources. 

Scott Landis, a freelance writer/photographer living in Coatesville, Penn., is a founder of the Woodworkers Alliance for Rainforest Protection (WARP).

GOOD WOOD & WHERE TO GET IT

Sources for wood grown at the Yanessa Co-op

Edensaw Woods Ltd.
211 Seton Rd.
Port Townsend, WA
98368
(206) 385-7878

Gilmer Wood Company
2211 NW Saint Helens Rd.
Portland, OR 97210
(503) 274-1271

Handloggers Hardwood Lumber
135 E. Francis Drake Blvd.
Larkspur, CA 94939
(415) 461-1180

The Luthier's Mercantile
412 Moore Lane
Healdsburg, CA
95448-0774
(707) 433-1823

Mount Storm
7890 Bell Rd.
Windsor, CA 95492
(707) 838-3177

Pittsford Lumber Company
50 State St.
Pittsford, NY 14534
(716) 381-3489

Woodworkers Supply
5402 South 40th St.
Phoenix, AZ 85040
(602) 437-4415

Domestic and recycled wood

Florida Ridge Wood Products Division
4114 Bridges Rd.
Groveland, FL 34736-9604
(904) 787-4251

Wild Iris Forestry
P.O. Box 1423
Redway, CA 95560
(707) 923-2344

The Three Faces of Dow

Understanding Dow Chemical's environmental change of heart

If there was a moment during my research about the Dow Chemical Company when I felt at last that I understood how to judge the "great things" this corporation claims for itself, it came while watching television. You could have seen that video moment for yourself, but only if you'd driven to Dow's hometown — the small, quiet city of Midland, Michigan, 100 miles north of Detroit.

Visiting Midland is like stepping into a Frank Capra movie: prosperous streets, conservative clothes, cheerful fellowship. Dow Chemical, where a quarter of the city's working residents draw their paychecks, has hardly ever laid anyone off, not even during the Great Depression. It (and the Dow family) have built some spectacular public works in Midland ... a terrific library, a nature center, a replica of the original Dow plant from 1890, and an array of buildings inspired by Frank Lloyd Wright. (Alden Dow, son of the chemical company's founder, was a Wright protege.) Then there is the scenic overlook, the panoramic view of a 1,900-acre erector set built of pipes and pumps — the Dow Michigan

chemical plant across the river.

In Midland I sat at an editing deck in the community TV station, to watch an August '90 episode of a local talk show called "It's Debatable." One guest was Karl Kamena, director of government affairs for Dow's plastics division, promoter of plastics recycling as a solution to the American landfill problem. Soft-voiced and deliberately earnest, he looked (on TV, at least) like Joe DiMaggio; local environmentalists privately consider him one of Dow's most self-assured and condescending debaters. His opponent, Mark Adams, was the 30-something co-founder of the Waste Oil Action Committee, a local environmental group. With curly dark hair and a flowered tie, Adams came across like Doonesbury's Mark Slackmeyer: He introduced himself by tossing a polystyrene clamshell across the table.

I had little hope at first for "It's Debatable." It's hard to say which was more irritating: Kamena's ponderous lecture on how "Styrofoam" is a trademarked name, or Adams' street-theatre-esque interruptions: "This clown Ronald McToxic may fool the children, but he's not fooling most of the adults out here." But then, about halfway through the program, Adams changed course. Holding up a report from the Michigan State packaging program, he asserted that polystyrene coffee cups leach chlorine into hot drinks. It was the first moment in the show when any outside evidence had been introduced.

"I'd be happy," said Kamena, "to have our people take a look at these studies."

Adams deftly took the opening. "If Dow found that these reports are in fact true," he asked, "would they stop producing polystyrene packaging?"

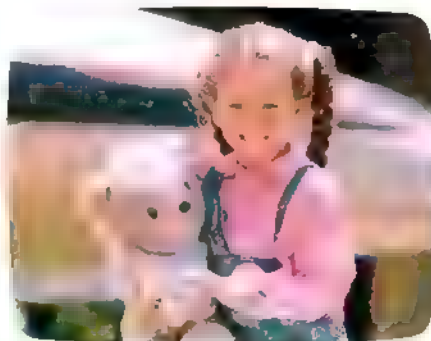
"If we found that polystyrene was causing a human health problem,"



PILOT (V.O.): Piloting a corporate jet for Dow can be interesting and rewarding.



The Corporate Angel Network uses empty seats on company business trips...



...to fly cancer patients who need specialized treatment. Patients like Christy.

BY ART KLEINER

said Kamena, "or an environmental problem that couldn't be controlled..." — he paused — "why would we want to produce that product?"

In their hearts, it appeared, both sides wanted the same thing: an end to poison. The environmentalists I'd met were technically savvy and reasonable. Dow's executives were fiercely moral, committed to good faith in a way I'd rarely encountered as a business reporter. A Dow executive named Dan Fellner had actually sought me out at **GARBAGE**, and invited me to Midland to investigate them, not knowing that for two years I'd been gathering information about the company. In this moment on TV, I believed Kamena: If Dow found out that polystyrene was toxic, in an era when such knowledge can't be covered up, why *would* they want to make the product?

But Mark Adams had an answer for that, too. Depending on your point of view, his answer either hit below the belt, or got to the heart of the tense contradictions under the veneer of corporate environmentalism. Why make poisons? "For the same reason," he said, "that Agent Orange was produced."

Dow Chemical is a company haunted by its identities, past and present, of which there are at least three. First, there is the "traditional" Dow: the frugal, small-town chemical company founded a century ago. In this Dow, science is a calling in which one steeps oneself, as others are dedicated to art, politics, or religion. It's a collegial company, close-knit and egalitarian, where chemistry PhDs stay from college until retirement, where everyone eats in the same cafeteria, and where the toxicology lab dates back to the 1930s. It's the Dow whose corporate ethic says that science is responsible for quality of life, and that empirical evidence is

the basis for wisdom.

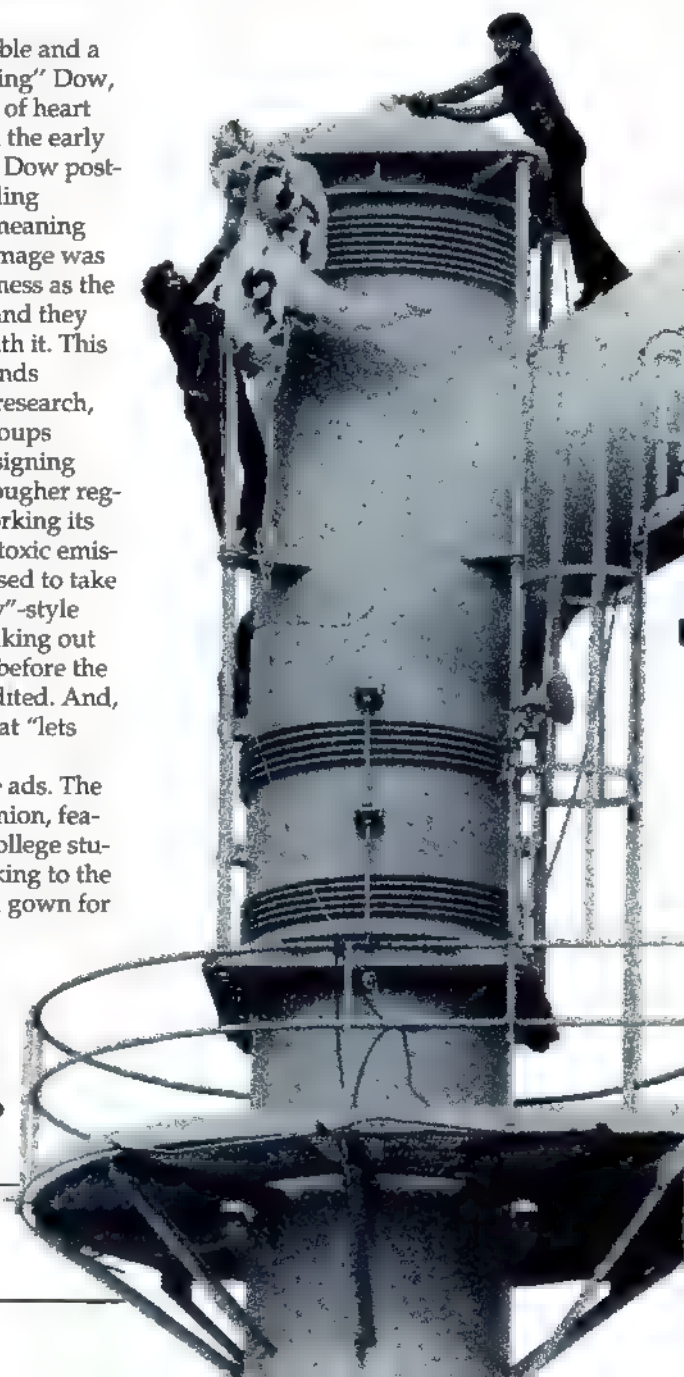
But there is also the "antagonistic" Dow — the Dow of napalm and Agent Orange. This is the Dow that bitterly fought Oregon housewives and Vietnam veterans over herbicide sprays, and still denies the links between those sprays and cancer. In the 1970s and early 1980s, this Dow stonewalled information requests and pulled funding from a local university because Jane Fonda spoke there. And this is the Dow which, even today, gets accused of backroom politics and dirty tricks.

The third Dow is admirable and a little clumsy. It's the "learning" Dow, the company with a change of heart about environmentalism. In the early 1980s, the executives of this Dow posted signs in their offices reading "Perception is Reality" — meaning that the company's public image was as much a part of their business as the periodic table of elements, and they had better come to terms with it. This is the Dow that funds wetlands preservation and recycling research, that consults community groups about new plants before designing them, that has lobbied for tougher regulatory standards and is working its way towards a goal of zero toxic emissions. It's the Dow that refused to take part in the hype over "Hefty"-style biodegradable plastics, speaking out on the technical flaws even before the bags were popularly discredited. And, of course, this is the Dow that "lets you do great things."

You may have seen those ads. The most memorable, in my opinion, features a strawberry-blonde college student with a strong jaw, walking to the graduation stand in cap and gown for her diploma. "When I was growing up," she says in

voice-over, "Mom and Dad taught me that we've only got one planet." (Cut to her beaming parents.) "And we'd better take care of it," she continues. "Now, I'm about to join a company that's committed itself to helping people preserve our wildlife, and to finding new ways to protect the Earth." As the theme music blares, she turns passionately to the camera and delivers her last words with fierce determination: "I can't wait." The lyrics rise in counterpoint: "You can make a dif-

In 1985, Greenpeace tried to unfurl a banner atop Dow's styrene monomer tower.



ference in what tomorrow brings, 'cause Dow lets you do great things."

It's easy to poke fun at the ads, or to give them the New York deconstructionist treatment, as *Esquire* did last October. Their writer, Mark Crispin Miller, accused Dow of trading on 1960s-style images (like a bumbling, sitcom-style father at a company softball game) to co-opt the idealism of young people who don't remember napalm. Even Miller, however, didn't notice that the spot with the graduate had been aired with an anti-hunger voice-over six years earlier. Back then, she was "about to walk into a Dow laboratory, to work on new ways to help grow more and better grain for those kids who so desperately need it." In other words, the environmentalist of '91 was preparing to make pesticides in '85.

OK, the ads are arrogant. ("Dow lets me do great things," snapped Diane Hebert, one of the company's prominent local opponents. "How generous.") Yet despite the cynicism the ads engender, the true weakness of the "great things" campaign is ironic: Its slickness makes the company seem worse than it actually is.

In reality, the three Dows — the traditional, the antagonistic, and the learning Dow — co-exist. The tension among them, coupled with the small-town atmosphere, allowed emotions to rise where they might have been held back in other companies. Dow is like every company pursuing and wrestling with environmentalism — only more so.

In a phone interview two years ago, I lobbed a soft question at Keith McKennon, then the president of Dow United States: "Even if your environmentalism is just a cosmetic public-relations effort," I asked, "isn't that in itself a major change?" His normally genial voice bristled in a way that made me think he'd been struggling with the question himself. "If it's a change of rhetoric only, it's worthless," he said, "no matter how remarkable you may think it is."

Why make poisons? His answer got to the heart of the tense contradictions under the veneer of corporate environmentalism. "For the same reason," Adams said, "that Agent Orange was produced."

No place in Michigan is more than eight miles from a lake; the state has more coastline than Florida or California. It's been an environmentally savvy place since the 1890s, when lumber companies finished stripping its white pine forests (partly to rebuild Chicago after the Great Fire). About that time, Herbert Dow came to central Michigan, drawn by its salt brine marshes. Dow was a 24-year-old chemist, a slim young entrepreneur in the Horatio Alger mode, with a Teddy Roosevelt moustache and a fondness for solitary exercise like wood-chopping. Dow had invented a method of electrocharging brine water, extracting bromine for photographic emulsion and chlorine for bleach.

Dow believed in making use of waste. Many Dow Chemical Company products came from leftover brine derivatives: soldering flux, Epsom salts, carbon tetrachloride, dyes, pesticides, agricultural sprays, and aspirin. Dow began making plastic in the 1930s, and sold its first consumer product in 1953: Saran Wrap. In '44, Dow chemists invented Styrofoam (an insulation plastic); the burgeoning styrene family, whence polystyrene cups and clamshells come, also has its roots in Midland. As with most U.S. companies, World War II dramatically boosted Dow's business: Saran Wrap was first used to keep American military equipment dust-free.

The traditional Dow got its first jolt during the Vietnam war, when protests targeted the company as napalm profiteers. Dow's executives replied,

in effect, "Blame the military, not us — we merely sell one of napalm's ingredients." They stopped selling even that in 1969, but the baby-killer image persisted — helping prod the antagonistic Dow into existence.

The "learning Dow" may have been born during a speech given by then-

Chairman Carl Gerstacker in 1966, at a water-pollution conference convened in the aftermath of Rachel Carson's *Silent Spring*. Gerstacker said that most CEOs probably didn't know how much pollution their companies were producing (a suspicion borne out with the Community Right-to-Know Law of 1986). He tentatively implied that most CEOs didn't care, and proposed three measures which most companies haven't adopted even now: sharing knowledge on pollution control, reducing waste at the source, and enlisting the help of everyone in a factory. Soon afterwards, Dow began its "product stewardship" program, refusing to sell industrial products unless buyers met their safety and environmental standards.

In 1969, a Dow-owned chlorinated waste pit flooded onto a Louisiana grazing area. When cattle died, the resulting lawsuit "was the beginning," says Jerry Martin, Dow's director of U.S. environmental affairs, "of our commitment that we weren't going to put that stuff in the ground any-



Now, I'm about to join a company that's committed itself to helping people preserve our wildlife...

more." During the next decade Dow began phasing out of landfills and deep-well injection storage (where wastes are plunged one or two miles down into salt-water aquifers). Twenty years later, they had comparatively few Love Canal-type sites to clean up. (For instance, there is no Superfund site in Midland.)

Ironically, Dow had been the most vehement major chemical company lobbying against Superfund. The antagonistic Dow gained dominance around 1974, spurred by the company's fiercely anti-regulation new CEO, Paul Orefice. In one celebrated 1978 case, some frustrated EPA staffers hired a pilot to take aerial photographs of Midland smokestacks for a Clean Air Act survey. The chemical company sued the EPA for trying to learn its trade secrets. "I think by and large," Jerry Martin says, "we thought we were doing the right thing environmentally. There was an internal belief that what we did was our business and nobody else's."

The antagonistic Dow began to feel the effects of the ill will in the late 1970s. Cancer complaints from exposure to herbicides — particularly 2,4,5-T and 2,4-D, as well as Agent Orange, which is a mixture of both of them — began to hit the courts and newspapers. One chronology of Dow-related health scares between 1974 and 1983, privately compiled by a former Michigan Department of Natural Resources staffer, takes up three sin-

gle-spaced pages. A group representing 4,000 Vietnam veterans took a \$180 million Agent Orange settlement in 1984. A community in Globe, Arizona, claiming that Forest Service spraying of 2,4,5-T had triggered miscarriages and illnesses, fought Dow in court for eleven years. The company settled, admitting no liability, in 1981. A similar spraying case in the Alsea Valley in Oregon triggered a federal prohibition of 2,4,5-T. Dow sued the EPA over the prohibition, and finally dropped the suit in 1983.

Inevitably, the concern reached Midland. In 1978, Dow scientists found traces of dioxin (a chemical family of chlorine-based contaminants which included the toxic substance in Agent Orange) in the Tittabawassee River, which flows through Midland into Lake Michigan. Larry Fink, an analyst at the Michigan Department of Natural Resources (DNR), checked local cancer statistics and found they had increased during the 1970s to four times the national rate. Fink tried to block a Dow water-disposal permit until a complete epidemiology could be performed. (As it happens, the epidemiology came out only this February. It found no abnormal illness rates — a question we'll return to.) Meanwhile, other activists matched records of spills from Dow brine wells against local cancer complaints, instigating controversies over dioxin in the groundwater. Finally, in 1982, an EPA staffer leaked the fact that Dow had

critiqued an EPA report before publication. This triggered a Congressional investigation. TV cameras descended on Midland

It was a remarkably frustrating series of events for both sides. I've talked to seven or eight Dow executives, including some speaking off the record, who say dioxin was a technical non-issue; they had studied their own workers' cancer rates and found them lower than in the general population; and if that were true, how could the public be at greater risk?

Nor did local department of health records show an increase in cancer.

Dow's point man then was David Buzzelli, now the corporation's chief environmental officer. Buzzelli was an outdoorsman himself, a member of Ducks Unlimited — a genial man with arched eyebrows, a solid physique, and an emotional tie to the dioxin issue. His job at Dow before environmental affairs had been running their manufacturing operation. A few days after he had taken that job, Geraldo Rivera had "ripped Dow and our herbicide 2,4,5-T up one side and down the other on 20/20. So, here I was telling my wife, 'Isn't this an exciting challenge?' and I turn on the television and someone is taking a knife to my baby." Buzzelli wasn't the only Dow staffer to feel that way; many Dow people were tempted to see the hubbub as leftover napalm-bashing, especially since out-of-towners seemed to be raising all the commotion. "The company I knew," he said, "wasn't the company the public saw."

But the dioxin controversy was not a good way to prove it. No one disputes the immense toxicity of dioxins, or the fact that they linger in living tissue. But the threshold amounts (Dow measured its emissions in parts per trillion, and claimed the concentrations were too small to be dangerous), the degree of carcinogenicity, and the triggers of health effects are still under fierce debate. Untangling the truth about dioxin has been beyond the American scientific establishment for



... and to finding new ways to protect the earth.
SING: Yes, you can make a difference...



HER (V.O.): I can't wait.
SING: 'Cause Dow lets you do...

more than 15 years. But it's an emotional issue.

Then, in Midland, there were stories of mysterious ailments, often among people who felt afraid to protest too loudly in a company town. Diane Hebert (pronounced Eh-Bear), who came to public prominence by raising the brine-spills issue, says she often fielded late-night calls about chemical leaks. "It might be ten o'clock, and someone tells you that their child died of a rare heart defect (and they lived in an area where you know the water's bad), and both their in-laws died of pancreatic cancer and so did the dog, and what do you say? You keep responding."

Television news crews found Hebert, who is petite with fluffy blonde hair, photogenic; they would interview her curled up on her couch, looking and talking like a likable flight attendant (which she once had been). But that image was deceptive; she had the persistence to spend hours in file-rooms at the Michigan DNR, looking for contradictions, and the co-gency to articulate them. Judging from newspaper clippings, that articulation became increasingly persuasive.

Many Midland people supported Dow; they still performed, ostentatiously catching fish from the river, for TV news. But support dwindled to its lowest point during the final "significant emotional event," as Buzzelli later called it. In the spring of 1985, a team of Greenpeace members, trailed by TV cameras, paddled into the Tittabawassee on inflated rafts to plug Dow's discharge pipes. After several days, they were arrested; in a county jail bloodtest, a 27-year-old Greenpeace staffer named Melissa Ortquist tested positive for syphilis. (Later tests near her home in upstate New York contradicted the results.) That week, a Dow public-relations executive made the mistake of calling Diane Hebert and telling her that Ortquist "had V.D."

Typical Midlanders hadn't had much use for the Greenpeace people, who were seen as hippies and hyp-

Typical Midlanders hadn't had much use for Greenpeace people who were seen as hippies and hypocrites (some of them smoked cigarettes while preaching about cancer from dioxin).

ocrites (some of them smoked cigarettes while preaching about cancer from dioxin). But when the news broke about Ortquist, that was different. The "traditional" Dow was not supposed to indulge in cheap shots. Moreover, the incident raised a disturbing question: If Dow could get past privacy laws to see those test results from the Midland health department, did that mean the company could see — and possibly edit — county health statistics? Letters asking that question began to appear in the *Midland Daily News* (along with a full-page apology to Ortquist from the Dow chairman).

Dow had antagonized regulators for years, but never before most of its neighbors. Now people throughout the company pressed for a change in behavior. And other influences surfaced within the company. The company was moving "downstream," abandoning its pure bromine manufacture entirely, and making more consumer products. Marketing people worried about boycotts of Cepacol, Fantastik, and other consumer brands that Dow had recently acquired. The "Perception is Reality" signs went up; the "great things" ads were planned. David Buzzelli, already seeking alternatives to antagonism, became president of Dow Canada, where he joined that country's business roundtables, inspired by the U.N. Brundtland Commission's promotion of sustainable development. If environmental quality and economic growth depended on each other, then (the Canadians felt) business people and community leaders should meet to find common solutions. Other Dow executives, finding themselves in an ongoing

give-and-take with environmentalists, began to listen to them. When Orefice moved to board chairmanship in 1985, he was replaced as CEO by the Bulgarian-born Frank Popoff; Popoff's environmental speeches were perhaps the most obvious signal that a change had begun in the company.

If the learning Dow has done nothing else, it has instilled a fervor about environmentalism in its home town. The 1990 Midland Earth Day festivities (funded and abetted by Dow) involved 20,000 people, one-third of the county's residents. There's a well-funded Midland community recycling center, and an extensive office-paper recycling project; during my Midland visit, I watched David Buzzelli ceremoniously don a t-shirt and shovel the one-millionth pound of Dow office paper into a recycling truck. Dow's recycling enthusiasm may have begun as public relations, aimed at staving off bans on polystyrene (a "great things" ad last year showed backpackers cooing over a plastic-lumber park bench). But to its credit, the company has focused its recent recycling efforts into research — on collection and processing of such heretofore nonreusable substances as coated magazine paper and Saran Wrap.

As for Dow's recent openness with information, some of that is mandated by law, particularly the 1986



SING: You're on your way . . .
SON: . . . so in my interview they told me Dow has a way to take . . .

"Community Right-to-Know"

Superfund amendments. But Dow can take credit for going beyond the law in several ways: making its local plant managers, instead of P.R. people, work closely with community groups, for instance. The company which once sued the EPA for flying overhead now volunteers facts. Candor is typical of the dozen or so Dow people I've interviewed during the past three years.

Still more significantly, the company has embraced the once-heretical ideas which Gerstacker suggested back in 1966, particularly the concept of reducing waste as deeply within the manufacturing process as possible. Previously, when the EPA set an emissions limit, Dow (and other companies) would strain, scrub, filter, or dilute its pollutants so they fell below that level. When a group like Greenpeace pushed for "zero discharge," Dow scientists retorted that perfection was an impossible goal. The idea drowned in semantic posturing. But it turns out that constant improvement, year after year, does much more to reduce pollution than merely targeting an "acceptable" amount of waste.

Waste reduction can't help but promote employee involvement throughout a company. The methods involve powerful statistical-measurement techniques that require people at every level to monitor and understand their emissions. Dow, already somewhat egalitarian, was a natural for this. The company publishes an impressive list, compiled by their

Louisiana-based energy engineer Kenneth Nelson, of ninety pollution-cutting improvements suggested by Dow staffers. They're nitty-gritty ideas: redesigning the shape of catalytic converters so chemicals flow more evenly; installing corrosion-resistant pipes; or simply working with their chemical suppliers to get purer raw materials. Called "Waste Reduction Always Pays," or WRAP, the program convinced the hardliners within Dow: Not only did the corrosion-free pipes eliminate the need for a hydrochloric-caustic cleanser (which would then be discharged), but it also saved \$890,000 a year.

In 1984, Dow released about 10.5 million pounds; by 1988, their annual Michigan emissions had been cut in half. And the figures continue to go down; though they're the second-largest chemical company, the EPA ranked them 29th in total emissions this year. But is that enough to give Dow ecological credibility? A local activist named Terry Miller showed me those Michigan figures, and then said he was skeptical of them. Borrowing an argument from Barry Commoner, he said: "The only environmental successes occurred when we legislated certain pollutants, like DDT, out of existence. 'Waste reduction' justifies the current line of products, simply by saying 'We did better than we did last year.'" By this argument, if Dow really wanted to prove itself environmentalist, it would do what Paul Connett of St. Lawrence University suggests — eliminate all products made of chlo-

rine. (Why chlorine? Because it is rarely found in organic life, it resists biological decay, and its toxicity builds up over time as it accumulates in fatty tissue. It was too bad, Connett says, that nobody talked to Herbert Dow in the early days and said, "Nature doesn't exploit this chemical. What are the long-term ramifications of your exploiting it?")

Arguing this point leads inevitably into the swamp of comparative risk. Lead-free gas uses chlorine; would leaded gas be better? Sheet metal requires chlorine cleaning; should we revert to wood vehicles? No doubt you've heard such debates, which seem to founder because we don't know many long-term comparative effects of products. We lack comprehensive data.

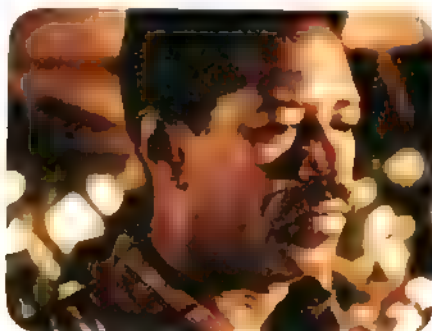
That's where Dow and other companies could contribute — as Larry Fink, the Michigan DNR gadfly from Dow's antagonistic years, pointed out recently. He talked about the inconclusiveness of research on chemical hazards. Industry lobbyists claim (quite reasonably, Fink said) that cancer in a laboratory animal means little; humans may not react the same way as animals. But the only alternative, epidemiology, has been undermined by chemical companies (including Dow) which have standard non-disclosure clauses in their legal settlements.

"If Dow wanted to show they were really upfront," Fink said, "they would put that information, without names, into a public database on patterns of toxicity." Such a data bank might include exposure records from the old dioxin lawsuits, Dow's studies of its own workers, independent surveys like the one just released in Midland, and statistics from the National Cancer Society. No profit-making company, not even the "learning" Dow, could be trusted to come up with this data on its own; but any data compiled *without* Dow's full-hearted participation, especially with its toxicological knowledge, would be inconclusive.

In Midland headquarters, such ideas might not be so unthinkable.



... all this coal and turn it into clean burnin' gas.
DAD: Wouldn't that cut down on acid rain?



DAD: Sounds like one serious job, son. I just wish it wasn't so far away...

Dow's expertise is invaluable. Maybe the nature of large institutions will inevitably cast them as antagonists. But the sincere desire of Dow people to participate in reform is undeniable.

Dow lawyers, when they first met with hazardous-waste citizens' groups in the litigious early 1980s, were startled to discover that the advocates didn't care that much about the right to sue. They wanted not to get sick. They wanted health screening: Were they being exposed to carcinogens? And if so, they wanted a remedy: an end to the exposure.

Some Dow policies stem directly from that discovery. Before building a new hazardous-waste incinerator in Ontario, for instance, Dow convened a citizen's advisory group to go over the plans, and submitted the permit request with the group's approval. Five such committees meet regularly, including one in Midland; next year, Dow plans to establish eight more.

Which is not to say that Dow is currently immune from criticism. In California, the Sierra Club and Environmental Defense Fund just forced Dow to remove chloroethelene from its K2R spot lifter. Dow's agricultural subsidiary, jointly owned with the Eli Lilly company, still seems to put more effort into defending 2,4-D than into developing carefully controlled, homeopathic herbicides that might replace indiscriminate spraying. (They promote integrated pest management, but one gets the impression, talking to them, that it's still very much a sideline.) As GARBAGE has noted, DowBrand's "Spiffits" disposable cleaning pads, while legal, represent an egregious use of cleaning solvents and packaging.

Finally, some Michigan activists blame Dow for not volunteering to take 25 carloads of contaminated soil into its state-of-the-art toxic-waste landfill in Midland. The soil, affected by a spill of chemicals from a train bound for a Dow plant in 1989, was placed this April on the much-publicized "toxic train," which traveled around the country looking for a dumping site. It eventually found one in Utah. David Buzzelli noted that both Michigan and Utah officials said the soil wasn't toxic. Of course, if it

wasn't toxic, then (you could argue) Dow should have championed putting it into a regular nearby landfill, but to do *that* Dow people would have had to get into a messy public argument about the soil's contamination. They chose not to get involved.

Environmentalists are saying Dow should be better than the law, better than the rest of the industry. Indeed, a truly environmentalist company has to be better than the general public. If Dow stops making Spiffits, people will buy their competitors' products. Is it reasonable to expect a company to undercut its own market share that way? Or does some still-unknown "win-win" solution lurk out there, as it did with "Waste Reduction Always Pays"? If society in general must be fundamentally reshaped, in the long run, to safeguard the environment (as many of us believe), then the good-faith expertise of companies like Dow could be invaluable. Maybe that's impossible; maybe the nature of large institutions will inevitably cast them as antagonists. But the sincere desire of Dow people to participate in reform, wherever it may lead, is undeniable.

Towards the end of my research, I got a call from Mary Sinclair, Midland's most prominent environmentalist. In her 60s, she is finishing a PhD on resource policy and environmental education at the University of Michigan, but she also has the distinction of being the first Midland citizen to publicly challenge Dow Chemical. Back in the 1960s, her arguments against a Dow-supported nuclear plant (being


built, it turned out, on sinking swampland) led to the plant being shut down. She had also criticized Dow during the dioxin wars. But for the past year she has served, at Dow's request, as a volunteer on their Midland citizen advisory committee.

I knew Mary Sinclair only through a telephone interview. Her voice is thin but oddly compelling, perhaps because she has a habit of hesitating before she says anything, as if she's reconsidering her thoughts before letting them out. "I wanted to know," she said, "what *you* thought of the company." Did I think perception was their only concern? By serving on this committee, was she wasting her time — and doing their public relations work for free? Or was the company sincere? Was she making a genuine contribution?

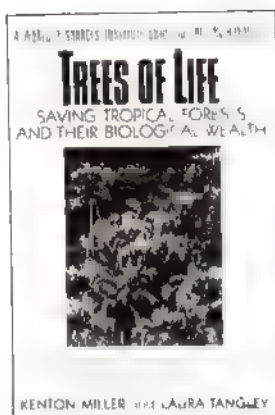
She added that two Dow initiatives had impressed her. They had begun a life-cycle analysis of their products, including energy efficiency and waste streams, as a basis (they had told her) for management decisions. And they were studying the total environmental impact of organic solvents, particularly those made of chlorine. "I talk to chemical engineers who are excited about these changes," she said, "and seem to think they're real. They think Dow has made up its mind to lead the industry."

I said I didn't know how to judge Dow *per se*, but I thought the answer depended on her view of human nature. If she thought people could make fundamental shifts in attitude, then corporations could probably do the same.

A week later, she called again. "I'm still not sure," she said. "But I've decided to stick. After a certain period, I'll be able to tell if I'm being manipulated. And if so, of course, I'll become as relentless as I was before. But I think they have a potential for establishing a pattern for deep industrial change that other companies might follow."

Then came that characteristic silence. "I believe in change," she said. "If a company can change, you should help them." 

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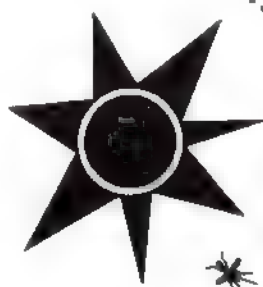
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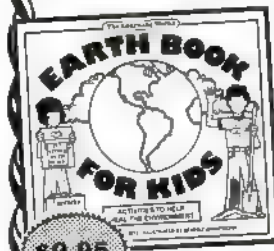
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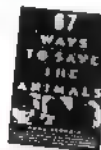


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Dog population, U.S.:
54.5 million

Cat population, U.S.:
63.2 million

Animals in shelters destroyed daily:
30,000

Expenditures on dog and cat food, 1989:
\$5,724,400,000

Expenditures on baby food, 1989:
\$2,683,085,000

Number of times dogs bit
mail carriers, 1990:
3,500

Source: Pet Food Institute; In One Day, Houghton Muffin; Dr. Franklin Lowe, Tufts Univ.

A LITTLE HAZ WASTE

Number of small-quantity generators* of hazardous waste, U.S.

Vehicle repair and maintenance
310,000

Manufacturing
280,000

Dry cleaning
26,000

Other (photo labs, exterminators, etc.)
319,000

Total: **935,000**

*firms that produce monthly less than 1,000 kg of hazardous waste

Source: Hazardous Waste for Small Quantity Generators, Island Press

FUN FACTS

Portion of U.S. covered by forest:
32% (740 million acres)

Portion of U.S. covered by shopping centers:
.000045% (103,476 acres)

Source: U.S. Dept. of Agriculture; Monitor magazine, GARBAGE staff

Projected cleanup cost for Dept. of Energy radioactive sites:
\$100 billion

Source: DOE

Decrease in summertime visibility in the eastern U.S. since 1948:

Over 50%

Source: National Weather Service

TOXIC CROPS

Increase in chemical pesticide use on crops since 1945:
3,300%

Crop failures due to pests, 1945:
31%

Crop failures due to pests, 1988:
37%

Source: Dr. David Pimentel, Cornell Univ.

AUTO-NEUROTICA

Cars manufactured in the U.S., 1990:
6,077,449

Cars imported, 1990:
3,944,602

Cars discarded in the U.S., 1990:
8.9 billion

Car-metal reclaimed in the U.S., 1990:
9,000,000

Source: Inst. of Scrap Recycling Industries, Motor Vehicle Manufacturer's Assoc., R.L. Polk

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If you can't find CITRA-SOLV in health-food stores or supermarkets, it's available through mail order from Finite Marketing, P.O. Box

2381, Dept. GM, Muncie, IN 47307; (800) 282-8433, and Seventh Generation, Dept. GM, Colchester, VT 05446-1672; (800) 456-1177.

Safer Stripper

That evil-smelling goop you wipe on furniture to remove paint or varnish is just that — evil. Methylene chloride, the active ingredient in many strippers, is a known animal carcinogen and a suspected human one. It's also vicious to skin and eyes. That's why you're instructed to wear heavy gloves and open windows when you use it.

Woodfinisher's Pride is a new formulation that excludes methylene chloride. About the consistency of thick pancake syrup, it smells like mint (from the paint stripper) or citrus (that's the varnish stripper). Sound tasty? Don't try it. A super-bitter compound has been added to make curious tasters spit.

The bottle boasts a "Breathe-Easy Formula." Just for kicks, I brushed the stuff on a patch of grooved trim on a table I've been meaning to strip. It was deep winter and the windows were caulked shut. I could smell the stripper, but it didn't trigger an impulse to break the window. Though it's called a 30-minute stripper, after 10 minutes the single coat of paint flaked up and surrendered.

What are the miracle compounds? The two required by law to be listed (due to their hazardous nature) are n-methyl-2-pyrrolidone (NMP), and gamma-butyrolactone. NMP is a cleaning solvent common in the aerospace and computer industries. Steve



Johnson, president of Creative Technologies, which developed the strippers, says NMP hasn't been used before because it's too costly. Through the usual top-secret processing miracles, Creative Technologies makes it cheaper. Gamma-butyrolactone is in the same boat: It's long been in use, but previously it was too expensive for consumer products.

Both components biodegrade with reasonable speed — about one week, under optimal conditions. The heavy molecules in Woodfinisher's Pride strippers evaporate 360 times more slowly than the lightweight methylene chloride, so you won't breathe as much. Even so, the strippers are eye and skin irritants. Inhaling too many vapors of the mixture can cause nausea, lack of coordination, and stupor.

"It isn't mouthwash," says Mr. Johnson. "But it's a step beyond what's out there."

There are extras: The cap is childproof. And the polyethylene and nylon bottle can be mailed back to the company when it's empty. You'll get \$1 for your trouble, and they'll refill the bottle for resale. Since we must have packages, this is the kind we should have.

Woodfinisher's Pride can be found at True Value, Home Depot, and Builder's Square stores, for \$9 or \$10 for a 32-oz. container.

Pump-Up Spray Bottle

If every manufacturer of sprayable liquids sold mix-it-yourself concentrate, we would all have an excuse to own a few bio-mat air-spray bottles. This can is a blast.

It looks like a spray can, but bio-mat air-spray is translucent polypropylene. It's got a white cap on the top and the bottom. When you lift the top cap to fill the bottle with sprayable liquid — water for your plants, or

cleaning fluid for your windows — you'll notice a thin cylinder. This is the valve through which air enters when you pump the bottom cap. The resulting compressed air replaces the traditional propellants, butane and pentane, which contribute to smog each time you press the typical spray-can nozzle.

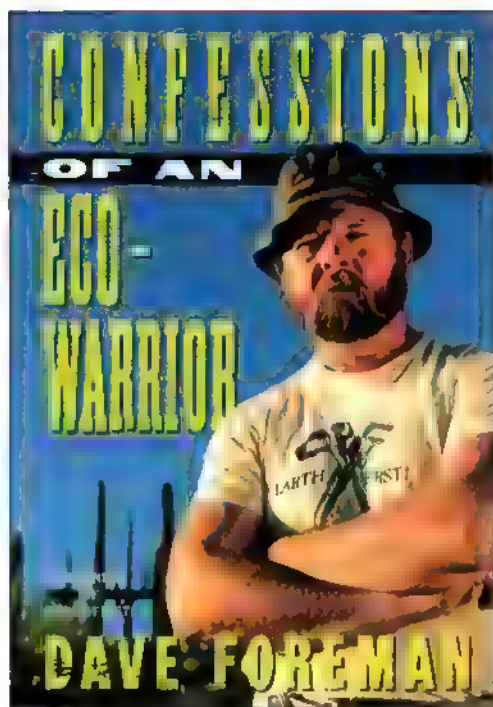
For short bursts of spray, this is not the perfect aerosol bottle: Each jet of super-fine mist is accompanied by a few larger droplets that fall short of the target, making it less than ideal for art projects or other precision tasks. But once the nozzle is pressed down, the jet of mist is consistent, losing range gradually as air pressure falls. The bottle holds a little over a cup of liquid, and the nozzle stands up to 10,000 sprayings — equivalent to about 500 disposable bottles.

If you want to use the bio-mat air-spray for paint or other goopy substances, ask about special nozzles. For smaller jobs, a smaller bottle will be available some time this fall. The cost of the bottle hasn't been determined. For a price, contact bio-mat air-spray, P.O. Box 2119, Dept. GM, Boulder, CO 80306-2119; (800) 950-MIST.

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RESOURCES

Confessions of an Eco-Warrior

by Dave Foreman. 228 pages. Mail order from Random House Inc., 400 Hahn Rd., Westminster, MD 21157; (800) 733-3000. Hardcover, \$22 ppd.

In the press, Dave Foreman is played for the ruthless, beer-bellied Bubba of the environment. How much of that is media inflation?

The Earth First! co-founder is getting larger than life. He speaks frankly about his distaste for many strains of the *homo sapiens* species, and that makes him a target for writers who need to boil complex stories down to Good vs. Bad. So every time

we turn around, there's another photo of the guy, shaking that meaty Earth First! fist in the air. Here, in Mr. Foreman's own raw language, is the life-sized Dave.

He leads with a recap of his efforts to work within "the system," both on Capitol Hill and with ranchers and timber barons. Though his writing style is rife with bluster, it pulls you in. His frustration is tangible, his outrage infectious. After reading about his dealings with "welfare ranchers" (ranchers who pay a pittance to run cattle on public lands), you may be ready to try a little ecological sabotage yourself.

Mr. Foreman argues that sabotage, a subject that's been violently argued within the environmental community, is a defensive act: It's self-defense for anyone who identifies with wilderness; it's defense of critters who can't elect representatives to Congress. By Mr. Foreman's reckoning, an attack on wilderness justifies a counterattack by anyone who feels threatened.

The book closes with an insightful critique of the environmental and conservation movements, and of environmental organizations, including Earth First! Mr. Foreman discusses in detail the changes the EF! movement has undergone in recent years, and his reasons for striking out on his own.

It's a relief to find a regular guy behind the scowling bruiser on the cover of *Confessions*. In spite of the tough-talkin', beer-

swillin' image he nurtures, his hard-thought and passionate philosophy comes through.

Biosphere 2: The Human Experiment

by John Allen. 156 pages. Attn. Cash Sales, Penguin USA, Box 999, Bergenfield, NJ 07621. Softcover, \$18.45, ppd.

The gene that instills the desire to go forth and multiply on Mars doesn't appear in my personal set of DNA. I like it here on Earth. But the folks who have spent eight years and \$60 million to create Biosphere 2 — an 85-foot-tall, airtight greenhouse with eight people locked inside — must have that gene in triplicate. They are trying to perfect a miniature biosphere that would allow Earthlings to lead a life of zero waste and zero pollution on another planet.

Space cravings aside, Biosphere 2 is fascinating. Within three acres of southern Arizona, planners are recreating as much of the Earth's diversity as possible — after all, the men and women who colonize Mars will want great scenery and wildlife. That means a rainforest, a desert, a marsh zone, a savannah and, of course, an ocean. The Earthonauts, who were to be sealed in this spring for a two-year experiment, will also need to produce a balanced diet.

Plants and animals — 3,800 species — have been scouted from all over the world and installed in Biosphere 2. Special soils were mixed to mimic earth from the various biomes. The planning team had to consider the impact of each bird, tree, and microbe on the internal food chain. For example, if the birds ate too many of the bees, the agricultural crops might not get pollinated. The biospherians would go hungry.

To those of us seeking better methods of living on Earth, the most interesting aspect of Biosphere 2 is that of living within a closed system: No waste may go out, no fresh air, water, or food may come in. While planet Earth — Biosphere 1 — is a closed system, its great size and complexity defer and disguise the effects of our unsustainable actions. Driving a car in Biosphere 2, for example, would be deadly, as emissions could not blow "away."

This supersensitive little environment requires that "biospherians" adopt simple, self-reliant lifestyles. They will eat primarily vegetarian meals supplemented with eggs and occasional meat from small breeds of chickens, pigs, and goats. They will grow and grind their own coffee and flour, press their



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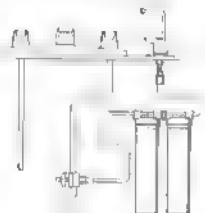
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own cooking oils, and make cheese from the goat milk. They will do agricultural work by hand. In addition to farming, each biospherian has a special responsibility — one is a doctor, another will oversee agriculture, a third will maintain the acres of glass and miles of pipes and ducts that hold Biosphere 2 together.

Self-styled scientist John Allen, author of *Biosphere 2: The Human Experiment*, is the driving force behind Biosphere 2. Haunted by accusations of dubious credentials and wacko cultism, maybe he is space crazed. Nonetheless, every subject he covers, from the history of closed ecosystems to

the swapping of gases among species, the construction of food chains, and living garbage-free, applies directly to how we live here on Earth.

Community Waste Education Manual

82 pages. Minnesota's Bookstore, 117 University Ave., St. Paul, MN 55155. \$24.45 ppd. To order with credit card, call (612) 297-3000. Quantity discounts available.

This is a step-by-step resource for activists and municipalities alike who want to organize a "Reduce, Reuse, Recycle" program. The manual, issued by Minnesota's Office of Waste Management, addresses every aspect of managing the waste stream, from setting goals, to grassroots organizing and lining up media coverage. And it does so without patronizing.

A lot of the essential brainstorming is done for you — a list of community organizations to contact, a rough budget, and a comparison of advertising options are provided. Sample letters, radio spots, and educational pamphlets are also included. The only part of the guide that's Minnesota-specific is the Resources section. But the back of the book offers a bonus: a bundle of camera-ready artwork for ads and educational brochures.

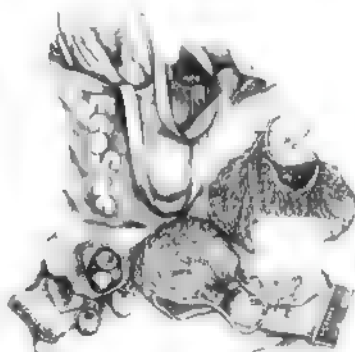
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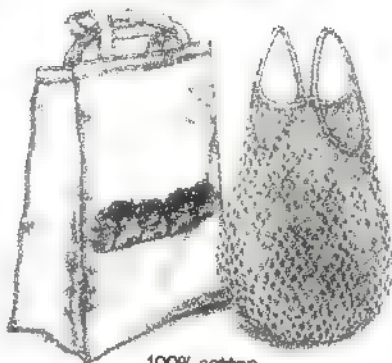
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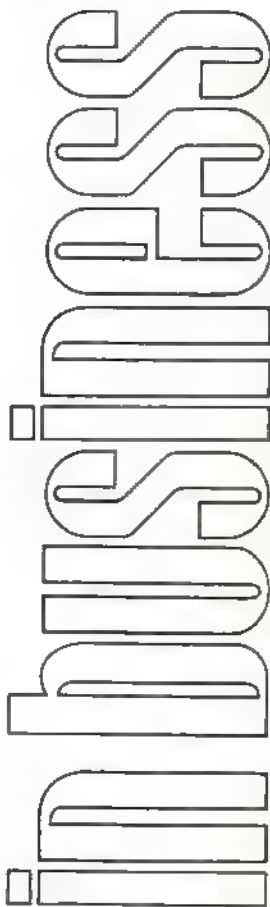
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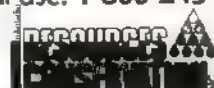
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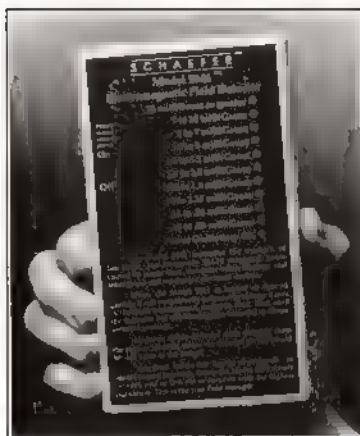
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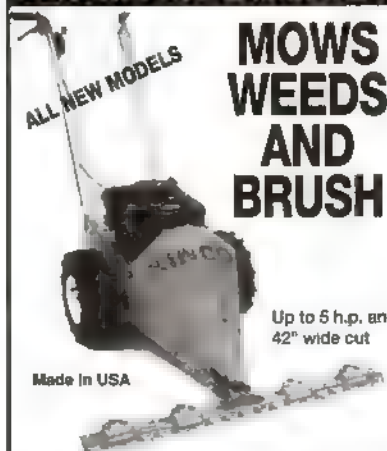
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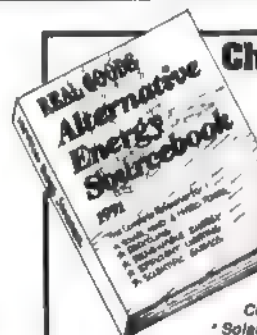
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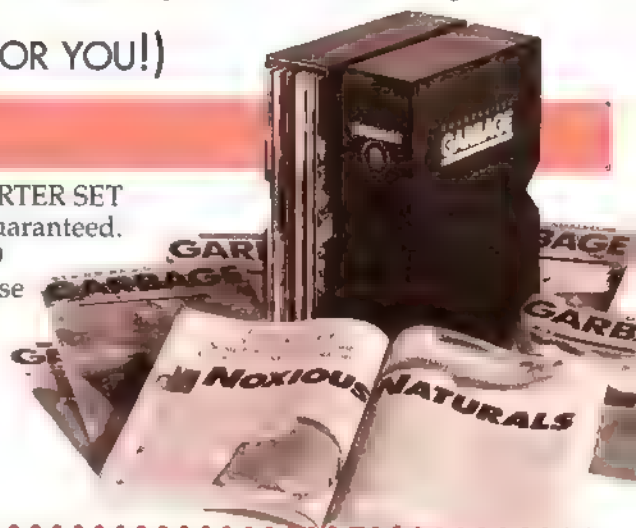
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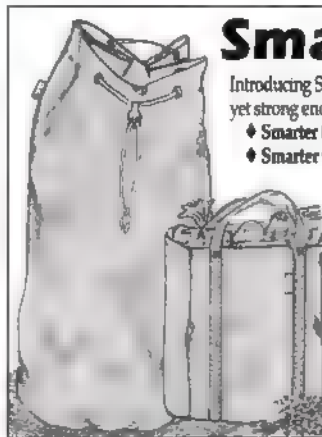
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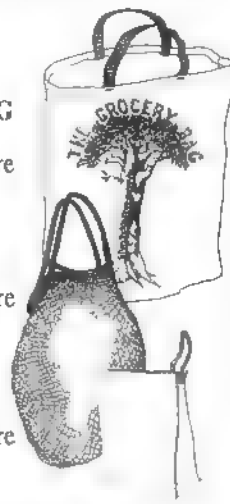
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Zapping the Carton's EZ-Recycle Rep

We've heard well-intentioned plastics-skeptics singing the praises of the paper milk carton — because "it's paper!" Some manufacturers even urge consumers to "please recycle" on their cartons, without quite addressing the recyclability of the carton itself. Well, now that many of us can recycle HDPE plastic milk jugs without traveling farther than the sidewalk, maybe it's time to take a closer look at the good old paper carton.

The fact is, milk and juice cartons are lined with polyethylene plastic, inside and out. And with the new screw-on lids that top a carton's sloping roof, an additional plastic has been added. This layered, inseparable, multi-material construction is as hard to recycle as the aseptic

juice box; but, unlike aseptics, cartons require energy-intensive refrigeration. Some will argue that the cartons *are* recyclable, or compostable. We've heard this tune before — from the aseptic-box makers. But "recyclable" is meaningless if the material isn't recycled in your community. Only a few pilot programs, sponsored by paper makers and aseptic-

DowBrands, purveyors of **Spiffits**, the single-use cleaning towels, has published a booklet on instilling self-esteem in teenagers. Or is it instilling an early love of convenience? A Dow sampler: "Consider a teenager's age and ability when assigning tasks that are complex. Spiffits can easily be used by teens."

Lin Pac Plastics of Wilson, N.C., is making polystyrene egg boxes and hamburger "clamshells" with some post-consumer content. But is this **burger box**, as the company claims, "the ultimate solution to the environmental challenges of the '90s"? The truth: A thin sheet of recycled plastic is sandwiched between layers of virgin PS.

box makers, collect cartons (mostly from schools). Recycling mills can "pulp off" and recover up to 80 percent of the high-quality paper, but the marketability of the left-over plastic shreds, and the economics overall, are unproven. The carton can be shredded for composting (where available), but microbes can't process the leftover plastic bits into plant nutrients.

The "paper" carton does not deserve paper's easy-to-recycle reputation. Why can't we go back to refillable glass? Or close the recycling loop on HDPE, which is increasingly collected for recycling?



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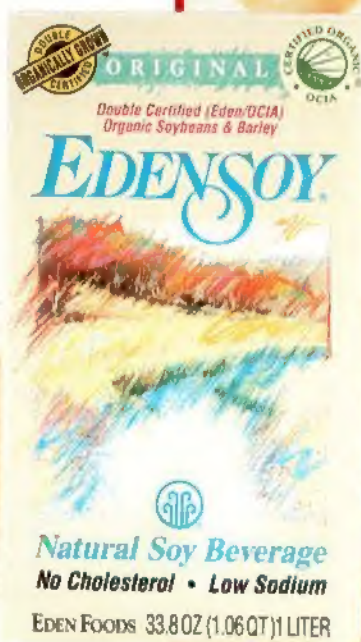
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The two girls scavenged their foil belts. When I asked to photograph them, they looked at each other and giggled. I took two frames. They ran away laughing.

